

## **APPENDIX 2.3-A**

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**LETTERS FROM RAIL OPERATORS ON FEASIBILITY OF INLAND BYPASS ROUTE**

NATIONAL RAILROAD PASSENGER CORPORATION

530 Water Street, 5th Floor, Oakland, CA 94667



May 8, 2003

Warren Weber  
Chief, Division of Rail  
California Department of Transportation  
1120 N Street  
P.O. Box 942874 – MS 74  
Sacramento, CA 94274-0001

Dear Mr. Weber:

Thank you for your letter of May 5, 2003 concerning the program level Environmental Impact Report/Environmental Impact Statement (EIR/EIS) currently being completed by the Federal Railroad Administration, the California High Speed Rail Authority and the California Department of Transportation. As you know, Amtrak has participated in this process by attending meetings, providing data and licensing aerial photography for use in the study. The Department has done an excellent job of managing such a difficult process.

The amount of analysis required in order to provide a comprehensive answer to your question by May 23, 2003 is not possible. At this stage in the planning process there are many unknowns related to an inland alignment through southern Orange County. For example, what will be the travel time on the proposed new alignment? Will there be station stops? If so, how many? Who will own and maintain the tunnels, bridges, and track structure on the proposed new alignment?

Under our current operations, the San Juan Capistrano Station would be impacted by this proposal. The San Juan Capistrano station ranks fifth in terms of ridership on the entire Pacific Surfliner route between San Diego and San Luis Obispo and is important to the success of the Pacific Surfliner Corridor. Any reduction in ridership at San Juan Capistrano would be of concern to Amtrak.

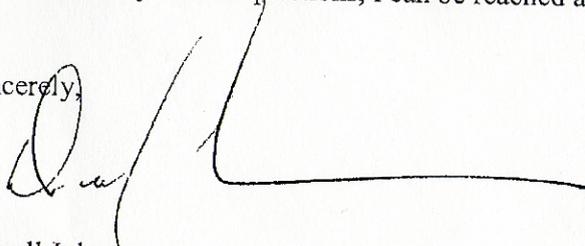
A key component of Amtrak's strategy in the Pacific Surfliner Corridor is to operate hourly service between Los Angeles and San Diego. Part of this strategy is built upon offering frequent, reliable service to all intercity rail stations along the entire corridor. By alternating between the inland route and the existing LOSSAN alignment, passengers traveling to or from San Juan Capistrano would experience a decreased level of service, thereby reducing ridership and revenue. It's not clear at this point if the proposed inland alignment would provide any benefit to the operation or efficiency of the Pacific Surfliner Corridor. Given this uncertainty at this point, we would be inclined to wait and

see if this alignment makes it through the screening process required by the EIR/EIS and then perform more detailed analysis.

In summary, there is not enough information available at this time to make a final decision, but given the potential cost of operating two rail corridors and the unknown benefits, Amtrak would not be inclined to operate rail services on both an inland route and on the existing LOSSAN route through southern Orange County.

If you have any further questions, I can be reached at (510) 238-4368.

Sincerely,

A handwritten signature in black ink, appearing to read 'Darrell Johnson', with a long horizontal line extending to the right.

Darrell Johnson  
*Director, Planning - California*

May 21, 2003

SCRRA File: G0000054-02

Mr. Warren Weber, Division of Rail Chief  
California Department of Transportation  
P.O. Box 942874, MS 74  
Sacramento, CA 94274-0001

RE: Response to Your Letter Dated May 5, 2003, Regarding the Inland Corridor Study in South Orange County

Dear Mr. Weber:

The Southern California Regional Rail Authority (SCRRA) received your letter dated May 5, 2003, requesting a response from our agency regarding the feasibility of operating commuter rail service on both the LOSSAN and an inland rail corridor. Insufficient information has been provided in order for our agency to respond to your specific technical questions about rolling stock, infrastructure, revenue and potential ridership. However, SCRRA can provide a general response without the inland corridor being further defined.

On April 7, 2000, the SCRRA Board authorized me to comment on the following concerning high speed rail initiatives:

1. Proposed services which may be competitive versus complementary of Metrolink Services;
2. Activities that impinge in any way on member agency owned right of way or access agreements with freight railroads; and
3. Proposed services or activities which would increase Metrolink operating costs or subsidy requirements.

It is within this context that SCRRA is responding to your letter.

SCRRA urges the Department of Transportation to further study only a new rail corridor capable of handling all train service - commuter rail, intercity passenger and freight service. The proposed inland route, as it has been described to my staff, would follow approximately the SR241 corridor. Considering recent analysis done by the Transportation Corridor Agencies (TCA), we are under the impression that the proposed route could not support the freight service which the Orange County Transportation Authority (OCTA) is required to provide access for as part of its purchase of the Orange Subdivision. The SCRRA preferred rail corridor would be near I-5, rather than near the proposed SR241 alignment. It must be emphasized that the right of way would have to be purchased and developed by another agency since neither the OCTA, which owns the current right of way, nor SCRRA would gain any significant operating advantage from the new corridor. In addition, the proposed tunneling options would cause a significant incremental operating cost - due to ventilation, tunnel maintenance, etc. - which must be borne by others. If an acceptable I-5 corridor is developed for all rail services to utilize, then SCRRA

Inland Corridor in South Orange County

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would likely propose to OCTA that service be discontinued on the Orange Subdivision south of the Laguna Niguel/Mission Viejo Metrolink Station.

Thank you for requesting our agency's input as to the feasibility of retaining local rail service on the LOSSAN corridor if an inland rail corridor became operational. Please continue to involve SCRRA in the program level EIR/EIS process for the LOSSAN Rail Corridor. If you have any questions regarding these comments please contact Deadra Knox, Strategic Development Planner, at (213) 452-0359 or [knoxd@scrta.net](mailto:knoxd@scrta.net).

Sincerely,

David Solow  
Chief Executive Officer

cc: Pat Merrill, Caltrans Rail Program  
Dennis Kuklis, Amtrak  
Shohreh Dupuis, OCTA  
Luisa Easter, Caltrans District 12  
SCRRA Files

bcc: Via e-mail –  
Steve Wylie, SCRRA  
Mike McGinley, SCRRA  
Deadra Knox, SCRRA  
Stephanie Wiggins, RCTC  
Michael Bair, SANBAG  
Mary Travis, VCTC  
Patricia Chen, MTA  
Darrell Johnson, Amtrak

## **APPENDIX 3.13-A**

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### **GENERAL DESCRIPTION OF BIOLOGICAL RESOURCE TOPICS**



## SENSITIVE VEGETATION COMMUNITIES

Sensitive vegetation communities are natural communities and habitats that are either unique, of relatively limited distribution in the region, or of particularly high wildlife value. These resources have been defined by federal, state, and local government conservation programs. The source used to determine the sensitive status of vegetation communities was the California Natural Diversity Database (CNDDDB). Each type of vegetation community is classified and priority ranked based on distribution, common or limited, or threats to conservation and preservation. The most sensitive of these plant communities—termed “natural communities of special concern,” “high-inventory priority” or “CNDDDB-sensitive”—are identified in Preliminary Description of the Terrestrial Natural Communities of California (Holland 1986) and catalogued by the CNDDDB.

## SENSITIVE PLANT SPECIES

Sensitive plant species include those that have been afforded special status and/or recognition by federal and state resource agencies, as well as private conservation organizations. In general, the principal reason an individual taxon (species, subspecies, or variety) is given such recognition is the documented or perceived decline or limitations of its population size or geographical extent and/or distribution resulting in most cases from habitat loss. Sources used to determine the sensitive status of plant species include the CNDDDB (California Department of Fish and Game 2002) and the California Native Plant Society (CNPS) electronic inventory (Skinner and Pavlik 1994).

## SENSITIVE WILDLIFE SPECIES

Sensitive wildlife species include those that have been afforded special status and/or recognition by federal and state resource agencies, as well as private conservation organizations. In general, the principal reason an individual taxon (species, subspecies, or variety) is given such recognition is the documented or perceived decline or limitations of its population size or geographical extent and/or distribution, resulting in most cases from habitat loss. Sources used to determine the sensitive status of wildlife species include the CNDDDB (California Department of Fish and Game 2002), the California Wildlife Habitat Relationships database System (California Department of Fish and Game 2003), lists available on the U.S. Fish & Wildlife Service’s Web site, and contacts with federal and state resource agencies.

## WILDLIFE MOVEMENT/MIGRATION CORRIDORS

Wildlife movement/migration corridors link together areas of suitable wildlife habitat that are otherwise separated by rugged terrain, changes in vegetation, or human disturbance. The fragmentation of open space areas by urbanization tends to create isolated islands of wildlife habitat. Several studies have shown that in the absence of habitat linkages, which facilitate wildlife movements between adjoining open space areas, some wildlife species, especially the larger and more mobile mammals, will not likely persist over time. This is because fragmentation and/or the isolation of habitat areas can prohibit the infusion of new individuals and genetic information (MacArthur and Wilson 1967; Soule 1987; Harris and Gallagher 1989; Bennett 1990). Wildlife corridors can often mitigate the effects of this fragmentation by 1) allowing animals to move between remaining habitats, thereby allowing depleted populations to be replenished; 2) providing escape routes from fire, predators, and human disturbances, thus reducing the risk that catastrophic events such as fire or disease will result in population or local species extinction; and 3) serving as travel routes for individual animals as they move within

their home ranges in search of food, water, mates, and other needs (Noss 1983; Farhig and Merriam 1985; Simberloff and Cox 1987; Harris and Gallagher 1989).

## JURISDICTIONAL WATERS

Lakes, rivers, streams, and other water bodies are termed “jurisdictional waters” when they are protected by federal and/or state law. Special aquatic sites, which include wetlands, are considered an important subset of jurisdictional waters.

Under Section 404 of the Clean Water Act (CWA) of 1972, the U.S. Army Corps of Engineers (USACE) has the authority to regulate activity that could discharge fill or dredged material or otherwise adversely modify “waters of the U.S.”

The term waters of the U.S. as defined in Code of Federal Regulations (33 C.F.R. 328.3[a]; 40 C.F.R. 230.3[s]) includes:

- All waters that are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
- All interstate waters, including interstate wetlands (wetlands are defined by the federal government [C.F.R. 328.3(b), 1991] as “those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions”);
- All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mud flats, sand flats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation, or destruction of which could affect interstate or foreign commerce including any such waters which are or could be used by interstate or foreign travelers for recreational or other purposes; or from which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or which are used or could be used for industrial purposes by industries in interstate commerce;
- All impoundments of waters otherwise defined as waters of the U.S. under the definition;
- Tributaries of waters identified in the above items;
- Territorial seas;
- Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in the previous items; and
- Waters of the U.S. that do not include prior converted cropland. Notwithstanding the determination of an area’s status as prior converted cropland by any other federal agency, for the purposes of the CWA, the final authority regarding CWA jurisdiction remains with the U.S. Environmental Protection Agency (EPA [328.3(a)(8) added 58 F.R. 45035, Aug. 25, 1993]).

In 1987, USACE published a manual that standardized the manner in which waters, including wetlands, were to be delineated nationwide. To determine whether areas appearing to be wetlands are subject to USACE jurisdiction (i.e., are “jurisdictional” wetlands), a wetland delineation must be performed. Under normal circumstances, three positive indicators must be

present for an area to be classified as a jurisdictional wetland: (1) hydrology providing permanent or periodic inundation by groundwater or surface water, (2) hydrophytic vegetation, and (3) hydric soils. Wetlands and other waters that could fall within USACE's jurisdiction are referred to as jurisdictional waters.



## **APPENDIX 3.13-B**

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### **DETAILED DESCRIPTION OF BIOLOGY AND WETLANDS REGULATORY REQUIREMENTS**



## FEDERAL REGULATIONS

### National Environmental Policy Act (42 U.S.C. 4321 et seq.)

The National Environmental Policy Act (NEPA) declares a continuing federal policy "... to use all practicable means and measures ... to create and maintain conditions under which [human] and nature can exist in productive harmony, and fulfill the social, economic and other requirements of present and future generations." NEPA directs a "... systematic, interdisciplinary approach ..." to planning and decision making and requires environmental statements for "... major federal actions significantly affecting the quality of the human environment." Implementing regulations by the Council of Environmental Quality (CEQ; 40 C.F.R. Parts 1500–1508) require federal agencies to identify and assess reasonable alternatives to proposed actions that will restore and enhance the quality of the human environment and avoid or minimize adverse environmental impacts.

### Endangered Species Act (16 U.S.C. 1531–1543)

The Federal Endangered Species Act (FESA) and subsequent amendments provide guidance for the conservation of endangered and threatened species and the ecosystems on which they depend.

Section 7 of the FESA requires federal agencies, in consultation with and with the assistance of, the Secretary of the Interior or the Secretary of Commerce, as appropriate, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse modifications of critical habitat for these species. The U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries) share responsibilities for administering the FESA.

Section 9 of the FESA lists those actions that are prohibited under the FESA. The "take" of a species listed in accordance with the Act is prohibited. A take is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct of any listed species."

There are two processes whereby take is allowed when it is incidental to an otherwise legal activity. Section 10 of the FESA provides a means whereby a nonfederal action with a potential to result in the take of a listed species could be allowed under an incidental take permit. Application procedures are found at 50 C.F.R. Parts 13 and 17 for species under the jurisdiction of USFWS, and 50 C.F.R. Parts 217, 220, and 222 for species under the jurisdiction of NOAA Fisheries.

An incidental take permit is required when non-federal activities would potentially result in the take of a threatened or endangered species. Section 10(a)(2)(A) of the FESA requires an applicant for an incidental take permit to submit a "conservation plan" that specifies, among other things, the impacts that are likely to result from the taking and the measures the permit applicant will undertake to minimize and mitigate such impacts. A conservation plan under the FESA has come to be known as a "habitat conservation plan" (HCP). The purpose of the HCP process is to ensure the adequate minimizing and mitigation of the effects of authorized incidental take. There are many HCPs throughout California. Proposed projects must consider impacts within any HCP/MSHCP planning areas and the potential for participation in such plans as a part of the mitigation planning effort at the project-level of analysis.

**Migratory Bird Treaty Act (16 U.S.C. 703-12)**

The Migratory Bird Treaty Act (MBTA) with Canada, Mexico, and Japan makes it unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, or kill migratory birds. The law applies to the removal of nests occupied by migratory birds during the breeding season.

**Clean Water Act (33 U.S.C. 1251-1376)**

The Clean Water Act (CWA) provides guidance for the restoration and maintenance of the chemical, physical, and biological integrity of the nation's waters.

Section 401 of the CWA requires that an applicant for a federal license or permit that allows activities resulting in a discharge to waters of the U.S. obtain a state certification that the discharge complies with other provisions of the CWA. The California Regional Water Quality Control Board (RWQCB) administers the certification program within California.

Section 402 of the CWA establishes a permitting system for the discharge of any pollutant (except dredged or fill materials) into the waters of the U.S., which requires National Pollutant Discharge Elimination System (NPDES) permits.

Section 404 of the CWA establishes a permit program, administered by the U.S. Army Corps of Engineers (USACE), regulating discharge of dredged or fill materials into waters of the U.S., including wetlands. Implementing regulations by the USACE are found at 33 C.F.R. Parts 320–330. Guidelines for implementation are referred to as the Section 404(b)(1) Guidelines that were developed by the U.S. Environmental Protection Agency (EPA) in conjunction with USACE (40 C.F.R. Part 230). The Guidelines allow the discharge of fill materials into the aquatic system only if there is no practicable alternative that would have less adverse impacts.

**Section 10 of the Rivers and Harbors Act (33 U.S.C. 401 et seq.)**

Section 10 of the Rivers and Harbors Act, administered by USACE, requires permits in navigable waters of the U.S. for all structures such as riprap and activities such as dredging. Navigable waters are defined as those subject to the ebb and flow of the tide and susceptible to use in their natural condition or by reasonable improvements as means of interstate transport or foreign commerce. USACE grants or denies permits based on the effects of navigation. Most activities covered under this act are also covered under Section 404 of the CWA.

**Fish and Wildlife Coordination Act (16 U.S.C. 661–666)**

This act applies to federal projects where the waters of any stream or other body of water are impounded, diverted, deepened, or otherwise modified. Project proponents are required to consult with USFWS and the California Department of Fish and Game (CDFG). These agencies prepare reports and recommendations that document project effects on wildlife and identify measures that may be adopted to prevent loss or damage to plant and animal resources. Provisions of this act are implemented through the NEPA and Section 404 permit processes.

**Coastal Zone Management Act of 1972 (16 U.S.C. 1451 et seq.)**

The Coastal Zone Management Program (CZMP) is authorized by the Coastal Zone Management Act of 1972 and administered at the federal level by the Coastal Programs Division (CPD) within the National Oceanic and Atmospheric Administration's Office of Ocean and Coastal Resource Management (OCRM). The CPD is responsible for advancing national coastal management objectives and maintaining and strengthening state and territorial coastal

management capabilities. It supports states through financial assistance, mediation, technical services and information, and participation in priority state, regional, and local forums. The CZMP leaves day-to-day management decisions at the state level in the 34 states and territories with federally approved coastal management programs, including California (California Coastal Commission and San Francisco Bay Conservation and Development Commission). Wetlands found in the “coastal zone” are regulated under this act.

### **Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801 et seq.)**

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), as amended by the Sustainable Fisheries Act (P.L. 104-267) mandates that the Secretary of Commerce (Secretary) shall establish guidelines, by regulation, to assist the Fishery Management Councils in the description and identification of Essential Fishery Habitat (EFH) in Fishery Management Plans, including adverse impacts on such habitat. The Magnuson-Stevens Act also requires consideration of actions to ensure the conservation and enhancement of such EFH. EFH is defined as “those waters and substrate necessary for fish for spawning, breeding, feeding, of growth to maturity.” The concept of EFH is similar to the concept of “critical habitat” presented in the Endangered Species Act. The Magnuson-Stevens Act applies to most state waters (0 to 3 miles offshore) and federal waters in general (2 to 200 miles offshore, also referred to as the “Exclusive Economic Zone”).

### **Executive Order 11990, Protection of Wetlands (May 24, 1977)**

This Executive Order (EO) establishes a national policy to avoid adverse impacts on wetlands whenever there is a practicable alternative. On projects with federal actions or approvals, impacts on wetlands must be identified in the environmental document. Alternatives that avoid wetlands must be considered. If wetland impacts cannot be avoided, then all practicable measures to minimize harm to those wetlands must be included and documented in the final environmental document for the proposed project.

### **Executive Order 13112, Invasive Species (February 3, 1999)**

This EO calls on Executive Branch agencies to work to prevent and control the introduction and spread of invasive species. Nonnative flora and fauna can cause substantial change to ecosystems, upset the ecological balance, and have the potential to cause economic harm. Highway corridors provide opportunities for the movement of invasive species through the landscape.

## **STATE LAWS AND REGULATIONS**

### **California Environmental Quality Act (Public Resources Code 21000 et seq.)**

The California Environmental Quality Act (CEQA) establishes state policy to prevent significant, avoidable damage to the environment by requiring changes in projects through the use of feasible alternatives or mitigation measures. CEQA applies to actions directly undertaken by state lead agencies. Regulations for implementation are found in the state CEQA Guidelines (Title 14 C.C.R. § 15000 et seq.) published by the California Resources Agency.

### **California Endangered Species Act (Fish and Game Code 2050 et seq.)**

The California Endangered Species Act (CESA) establishes the policy of the state to conserve, protect, restore, and enhance threatened or endangered species and their habitats. CESA mandates that state agencies should not approve projects that would jeopardize the continued

existence of threatened or endangered species if reasonable and prudent alternatives are available that would avoid jeopardy. There are no state agency consultation procedures under CESA. For projects that affect both state- and federally listed species, compliance with FESA will satisfy CESA, if CDFG determines that the federal incidental take authorization is consistent with CESA under Fish and Game Code Section 2080.1. For projects that result in a take of a state-only listed species, the lead agency may apply for a take permit under Section 2081(b).

### **Native Plant Protection Act (Fish and Game Code 1900–1913)**

California's Native Plant Protection Act (NPPA), passed in 1977, requires all state agencies to use their authority to carry out programs to conserve endangered and rare native plants. Provisions of the NPPA prohibit the taking of listed plants from the wild and require notification of CDFG at least 10 days in advance of any change in land use which would adversely impact listed plants. This allows CDFG to salvage listed plant species that would otherwise be destroyed.

### **Streambed Alterations (Fish and Game Code 1601–1603)**

Under these sections of the Fish and Game Code, a lead agency must notify CDFG prior to implementing a project that would divert, obstruct, or change the natural flow, bed, channel, or bank of any river, stream, or lake. Preliminary notification and project review will generally occur during the environmental process. When an existing fish or wildlife resource may be substantially adversely affected, CDFG is required to propose reasonable project changes to protect the resource. These modifications are formalized in a Streambed Alteration Agreement that becomes part of the plans, specifications, and bid documents for the project.

### **California Coastal Act (Public Resources Code 30000 et seq.)**

The California Coastal Act of 1976 (CCA) made the California Coastal Commission, established by the voters in 1972, permanent. The Coastal Act includes specific policies (see Division 20 of the Public Resources Code) relating to terrestrial and marine habitat protection, visual resources, landform alteration, water quality, transportation, development design, and public works. These policies constitute the statutory standards applied to planning and regulatory decisions pursuant to the Coastal Act.

## **LOCAL PROVISIONS**

### **Significant Ecological Areas**

Los Angeles County defines and delineates significant ecological areas (SEAs) in conjunction with the Land Use and Open Space Elements of the county general plan. An area qualifies for recognition as an SEA if the area

- exists as habitat for endangered, threatened, or sensitive plant or animal species;
- represents biotic communities, vegetative associations, or habitat of plant or animal species that are either one-of-a-kind, or are restricted in distribution on a regional basis;
- represents biotic communities, vegetative associations, or habitat of plant or animal species that are either one-of-a-kind, or are restricted in distribution in Los Angeles County;

- is habitat that at some point in the life cycle of a species or group of species, serves as a concentrated breeding, feeding, resting, or migrating grounds, and is limited in availability;
- represents biotic resources that are of scientific interest because they are either an extreme in physical/geographical limitations, or they represent an unusual variation in a population or community;
- is important as game species habitat or as fisheries;
- would provide for the preservation of relatively undisturbed examples of the natural biotic communities in Los Angeles County; and/or
- is a special area, worthy of inclusion, but does not fit any of the above criteria.

The objectives are to preserve biological diversity and ensure future sustainability of biological diversity. To this end, the program seeks to identify areas that possess examples of biotic resources that cumulatively represent biological diversity and consolidate these areas into larger interconnected SEAs. There are over 60 designated SEAs in Los Angeles County. There are an additional 12 proposed SEAs totaling 442,983 acres in unincorporated Los Angeles County, which expand and interconnect existing SEAs. The Los Angeles General Plan Land Use Element sets forth SEA design compatibility criteria for proposed development within a designated SEA.

#### **Tree Protection/Preservation Ordinances**

Los Angeles County Ordinance 153,478 applies to all unincorporated areas of Los Angeles County. Cities within the county may have adopted the county ordinance or another stricter ordinance. Under the county ordinance, a person shall not cut, destroy, remove, relocate, inflict damage, or encroach into the protected zone of oak trees of a certain size.



## **APPENDIX 3.13-E**

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### **SPECIAL-STATUS PLANT AND WILDLIFE SPECIES IN STUDY AREA**



The following tables list the special-status plant and wildlife species reported within the study areas of the Rail Improvement alignment options.<sup>1</sup>

**Union Station to Irvine Station**

**Special-Status Plant Species**

COMMON NAME	SCIENTIFIC NAME	FED LIST	CAL LIST	CNPS
SOUTHERN TARPLANT	CENTROMADIA PARRYI SSP AUSTRALIS			1B
SAN FERNANDO VALLEY SPINEFLOWER	CHORIZANTHE PARRYI VAR FERNANDINA		E	1B
MANY-STEMMED DUDLEYA	DUDLEYA MULTICAULIS			1B

**Special-Status Wildlife Species**

COMMON NAME	SCIENTIFIC NAME	FED LIST	CAL LIST	CDFG
BURROWING OWL	ATHENE CUNICULARIA			SC
SAN DIEGO HORNED LIZARD	PHYRYNOSOMA CORONATUM BLANVILLEI			SC

<sup>1</sup> T = Threatened; E = Endangered; 1B = Plants on the CPNS 1B List of plants, determined by the CPNS to be rare, threatened or endangered in California or elsewhere; SC = Species of concern.

## San Juan Capistrano

### Special-Status Plant Species

OPTION(s)	COMMON NAME	SCIENTIFIC NAME	FED LIST	CAL LIST	CNPS
I-5 Tunnel Trabuco Creek	COULTERS SALTBRUSH	ATRIPLEX COULTERI			1B

### Special-Status Wildlife Species

OPTION(s)	COMMON NAME	SCIENTIFIC NAME	FED LIST	CAL LIST	CDFG
I-5 Tunnel Trabuco Creek	TIDEWATER GOBY	EUCYCLOGOBIUS NEWBERRYI	E		SC
I-5 Tunnel Trabuco Creek	ARROYO CHUB	GILA ORCUTTI			SC
Trabuco Creek	SOUTHERN STEELHEAD*	ONCORHYNCHUS MYKISS IRIDEUS	E		

\* Not recorded in CNDDDB database, but recent fish surveys in Trabuco Creek may have detected Steelhead (USFWS, pers. Comm., January 7, 2004).

## Dana Point/San Clemente

### Special-Status Plant Species

OPTION(s)	COMMON NAME	SCIENTIFIC NAME	FED LIST	CAL LIST	CNPS
Short Tunnel Long Tunnel	BLOCHMAN'S DUDLYEA	DUDLYEA BLOCHMANIAE SSP BLOCHMANIAE			1B
Short Tunnel Long Tunnel	PROSTRATE NAVARRETIA	NAVARRETIA PROSTRATA			1B

### Special-Status Wildlife Species

OPTION(s)	COMMON NAME	SCIENTIFIC NAME	FED LIST	CAL LIST	CDFG
Short Tunnel Long Tunnel	SAN DIEGO FAIRY SHRIMP	BRANCHINECTA SANDIEGONENSIS	E		
Short Tunnel Long Tunnel	TIDEWATER GOBY	EUCYCLOGOBIUS NEWBERRYI	E		SC
Short Tunnel Long Tunnel	SOUTHERN STEELHEAD	ONCORHYNCHUS MYKISS IRIDEUS	E		SC
Short Tunnel Long Tunnel	COASTAL CALIFORNIA GNATCATCHER	POLIOPTILA CALIFORNICA	T		SC
Long Tunnel	LEAST BELLS VIREO	VIREO BLLII PUSILLUS	E	E	

## Camp Pendleton

### Special-Status Plant Species

COMMON NAME	SCIENTIFIC NAME	FED LIST	CAL LIST	CNPS
BLOCHMAN'S DUDLYEA	DUDLYEA BLOCHMANIAE SSP BLOCHMANIAE			1B
SAN DIEGO BUTTON-CELERY	ERYNGIUM ARISTULATUM VAR PARISHII	E	E	1B
COULTER'S GOLDFIELDS	LASTHENIA GLABRATA SSP COULTERI			1B
COAST WOOLLY-HEADS	NEMACAULIS DENUDATA VAR DENUDATA			1B

### Special-Status Wildlife Species

SCIENTIFIC NAME	COMMON NAME	FED LIST	CAL LIST	CDFG
WHITE-TAILED KITE	ELANUS LEUCURUS			SC
TIDEWATER GOBY	EUCYCLOGOBIUS NEWBERRYI	E		SC
PACIFIC POCKET MOUSE	PEROGNATHUS LONGIMEMBRIS PACIFICUS	E		SC
COASTAL CALIFORNIA GNATCATCHER	POLIOPTILA CALIFORNICA	T		SC
BANK SWALLOW	RIPARIA RIPRAIA		T	
LEAST BELL'S VIREO	VIREO BELLII PUSILLUS	E	E	

## Carlsbad

### Special-Status Plant Species

COMMON NAME	SCIENTIFIC NAME	FED LIST	CAL LIST	CNPS
SMOOTH TARPLANT	CENTROMADIA PUNGENS SSP LAEVIS			1B
ORCUTT'S PINCUSHION	CHAENACTIS GLABRIUSCULA VAR ORCUTTIANA			1B
SAN DIEGO BUTTON-CELERY	ERYNGIUM ARISTULATUM VAR PARISHII	E	E	1B
COAST WOOLLY-HEADS	NEMACAU LIS DENU DATA VAR DENU DATA			1B

### Special-Status Wildlife Species

COMMON NAME	SCIENTIFIC NAME	FED LIST	CAL LIST	CDFG
TIDEWATER GOBY	EUCYCLOGOBIUS NEWBERRYI	E		SC
WESTERN SNOWY PLOVER	CHARADRIUS ALEXANDRINUS NIVOSUS	T		SC
BELDING'S SAVANNAH SPARROW	PASSERCULUS SANDWICHENSIS BELDINGI		E	
LIGHT-FOOTED CLAPPER RAIL	RALLUS LONGIROSTRIS LEVIPES	E	E	
CALIFORNIA LEAST TERN	STERNA ANTILLARUM BROWNI	E	E	

**Encinitas**

**Special-Status Plant Species**

COMMON NAME	SCIENTIFIC NAME	FED LIST	CAL LIST	CNPS
ORCUTT'S PINCUSHION	CHAENACTIS GLABRIUSCULA VAR ORCUTTIANA			1B
DEL MAR MESA SAND ASTER	CORETHROGYNE FILAGINIFOLIA VAR LINIFOLIA			1B
DECUMBENT GOLDENBUSH	ISOCOMA MENZIESII VAR DECUMBENS			1B
COULTER'S GOLDFIELDS	LASTHENIA GLABRATA SSP COULTERI			1B
NUTTALL'S LOTUS	LOTUS NUTTALLIANUS			1B
COAST WOOLLY-HEADS	NEMACALIS DENUDATA VAR DENUDATA			1B

**Special-Status Wildlife Species**

COMMON NAME	SCIENTIFIC NAME	FED LIST	CAL LIST	CDFG
WESTERN SNOWY PLOVER	CHARADRIUS ALEXANDRINUS NIVOSUS	T		SC
CALIFORNIA BLACK RAIL	LATERALLUS JAMAICENSIS COTURNICULUS		T	
BELDING'S SAVANNAH SPARROW	PASSERCULUS SANDWICHENSIS BELDINGI		E	
LIGHT-FOOTED CLAPPER RAIL	RALLUS LONGIROSTRIS LEVIPES	E	E	
CALIFORNIA LEAST TERN	STERNA ANTILLARUM BROWNI	E	E	

**Del Mar**

**Special-Status Plant Species**

OPTION(s)	COMMON NAME	SCIENTIFIC NAME	FED LIST	CAL LIST	CNPS
I-5 Tunnel	DEL MAR MANZANITA	ARCTOSTAPHYLOS GLANDULOSA SSP CRASSIFOLIA	E		1B
Camino Tunnel I-5 Tunnel	LAKESIDE CEANOTHUS	CEANOTHUS CYANEUS			1B
Camino Tunnel I-5 Tunnel	ORCUTT'S PINCUSHION	CHAENACTIS GLABRIUSCULA VAR ORCUTTIANA			1B
Camino Tunnel I-5 Tunnel	ORCUTT'S SPINEFLOWER	CHORIZANTHE ORCUTTIANA	E	E	1B
I-5 Tunnel	SUMMER HOLLY	COMAROSTAPHYLIS DIVERSIFOLIA SSP DIVERSIFOLIA			1B
I-5 Tunnel	SAN DIEGO SAND ASTER	CORETHROGYNE FILAGINIFOLIA VAR INCANA			1B
I-5 Tunnel	DEL MAR MESA SAND ASTER	CORETHROGYNE FILAGINIFOLIA VAR LINIFOLIA			1B
Camino Tunnel I-5 Tunnel	SHORT-LEAVED DUDLEYA	DUDLEYA BREVIFOLIA		E	1B
Camino Tunnel I-5 Tunnel	COULTER'S GOLDFIELDS	LASTHENIA GLABRATA SSP COULTERI			1B
Camino Tunnel I-5 Tunnel	COAST WOOLLY-HEADS	NEMACAULIS DENUDATA VAR DENUDATA			1B

**Special-Status Wildlife Species**

OPTION(s)	COMMON NAME	SCIENTIFIC NAME	FED LIST	CAL LIST	CDFG
I-5 Tunnel	NORTHWESTERN SAN DIEGO POCKET MOUSE	CHAETODIPUS FALLAX FALLAX			SC
Camino Tunnel I-5 Tunnel	WESTERN SNOWY PLOVER	CHARADRIUS ALEXANDRINUS NIVOSUS	T		SC
Camino Tunnel I-5 Tunnel	CALIFORNIA BLACK RAIL	LATERALLUS JAMAICENSIS COTURNICULUS		T	
I-5 Tunnel	SAN DIEGO DESERT WOODRAT	NEOTOMA LEPIDA INTERMEDIA			SC
Camino Tunnel I-5 Tunnel	BELDING'S SAVANNAH SPARROW	PASSERCULUS SANDWICHENSIS BELDINGI		E	
Camino Tunnel I-5 Tunnel	LIGHT-FOOTED CLAPPER RAIL	RALLUS LONGIROSTRIS LEVIPES	E	E	
Camino Tunnel I-5 Tunnel	CALIFORNIA LEAST TERN	STERNA ANTILLARUM BROWNI	E	E	
Camino Tunnel	LEAST BELL'S VIREO	VIREO BELLII PUSILLUS	E	E	

## I-5/805 Split to Highway 52

### Special-Status Plant Species

OPTION(s)	COMMON NAME	SCIENTIFIC NAME	FED LIST	CAL LIST	CNPS
Miramar Tunnel I-5 Tunnel	LAKESIDE CEANOTHUS	CEANOTHUS CYANEUS			1B
Miramar Tunnel	ORCUTT'S PINCUSHION	CHAENACTIS GLABRIUSCULA VAR ORCUTTIANA			1B
I-5 Tunnel	SAN DIEGO BUTTON- CELERY	ERYNGIUM ARISTULATUM VAR PARISHII	E	E	1B
Miramar Tunnel I-5 Tunnel	COULTER'S GOLDFIELDS	LASTHENIA GLABRATA SSP COULTERI			1B
Miramar Tunnel	NUTTALL'S SCRUB OAK	QUERCUS DUMOSA			1B

### Special-Status Wildlife Species

OPTION(s)	COMMON NAME	SCIENTIFIC NAME	FED LIST	CAL LIST	CDFG
Miramar Tunnel	WESTERN SNOWY PLOVER	CHARADRIUS ALEXANDRINUS NIVOSUS	T		SC
Miramar Tunnel I-5 Tunnel	CALIFORNIA BLACK RAIL	LATERALLUS JAMAICENSIS COTURNICULUS		T	
Miramar Tunnel	BELDING'S SAVANNAH SPARROW	PASSERCULUS SANDWICHENSIS BELDINGI		E	
Miramar Tunnel	LIGHT-FOOTED CLAPPER RAIL	RALLUS LONGIROSTRIS LEVIPES	E	E	
Miramar Tunnel	CALIFORNIA LEAST TERN	STERNA ANTILLARUM BROWNI	E	E	
Miramar Tunnel	LEAST BELL'S VIREO	VIREO BELLII PUSILLUS	E	E	

## Highway 52 to Santa Fe Depot

### Special-Status Plant Species

COMMON NAME	SCIENTIFIC NAME	FED LIST	CAL LIST	CNPS
DAVIDSON'S SALTSCALE	ATRIPLEX SERENANA VAR DAVIDSONII			1B
ORCUTT'S PINCUSHION	CHAENACTIS GLABRIUSCULA VAR ORCUTTIANA			1B
SALT MARSH BIRD'S-BEAK	CORDYLANTHUS MARITIMUS SSP MARITIMUS	E	E	1B
VARIEGATED DUDLEYA	DUDLEYA VARIEGATA			1B
COULTER'S GOLDFIELDS	LASTHENIA GLABRATA SSP COULTERI			1B
ROBINSON'S PEPPER-GRASS	LEPIDIUM VIRGINICUM VAR ROBINSONII			1B
SAN DIEGO GOLDENSTAR	MUILLA CLEVELANDII			1B
COAST WOOLLY-HEADS	NEMACALIS DENUDATA VAR DENUDATA			1B
BRAND'S PHACELIA	PHACELIA STELLARIS			1B
OIL NESTSTRAW	STYLOCLINE CITROLEUM			1B

### Special-Status Wildlife Species

COMMON NAME	SCIENTIFIC NAME	FED LIST	CAL LIST	CDFG
CALIFORNIA LEAST TERN	STERNA ANTILLARUM BROWNIE	E	E	



## **APPENDIX 3.16-A**

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### **LIST OF PROJECTS FOR CUMULATIVE ANALYSIS**



County/MPO*	Highway/Facility	Description	Value (\$mil)	Completion Date
SCAG	Heavy rail extension	Wilshire Red Line (extension from Wilshire/Western to Mid-Cities)	2,461	2010
SCAG	Light rail	East Los Angeles transit corridor (extension from Atlantic to Norwalk/Whittier)	671	2002
SCAG	Light rail	Pasadena Blue Line (extension from Sierra Madre Villa [Pasadena] to Claremont)	1,276	2010
SCAG	Light rail	Vermont Green Line Station to Hollywood Blvd.	373	2010
SCAG	Commuter rail	Burbank/Glendale transit corridor (Union Station to Burbank Transit Station)	788	2010
SCAG	Light rail	Metro Green Line (extension from Marine Redondo to South Bay Galleria)	172	2010
SCAG	Rail/port	Alameda corridor east	402	2005
San Diego COG	Light rail	Mission Valley east	431	2010
San Diego COG	Light rail	Mid Coast, Old Town to Balboa	116	2010
San Diego COG	Light rail	NCTD, Oceanside to Escondido	237	2010
San Diego COG	Light rail	Mid Coast, Balboa to UTC	424	2004
San Diego COG	Light rail	North County Fair extension	90	2004
San Diego COG	Commuter/intercity rail	University City tunnel	272	2020
San Diego COG	Commuter/intercity rail	Camino Del Mar tunnel	89	2020
San Diego COG	SR-125	SR-905 to SR-54 tollway	330	2020
San Diego COG	SR-125	Sweetwater section: Briarwood Road to SR-94	160	2010
San Diego COG	SR-125	Fanita section: Navajo Road to Grossmont	34	2010
San Diego COG	SR-241	Foothill corridor: Orange County to I-5	265	2010
San Diego COG	SR-905	I-805 to Otay Mesa port of entry	179	2010

Notes:

1. County general plans and regional transportation plans from Metropolitan Planning Organizations (MPO).
2. The California High Speed Rail Authority is proposing a statewide high-speed train system, with one potential route along the LOSSAN Corridor between Union Station and Orange County (Irvine or Anaheim). However, this project is not considered in the cumulative analysis for the LOSSAN Corridor due to its current, early stage of planning and its completion timeframe of at least 2015.
3. The I-5 Managed Lanes/HOV project is included in the No Project programmed improvements described in Chapter 2.



## **APPENDIX 3.3-A**

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### **AIR QUALITY EMISSIONS CALCULATIONS**



Air emissions calculations done for the No Project Alternative, years 2003 and 2020, are shown on the tables that follow, listed below.

Table 1A	LOSSAN Corridor Train Traffic – Year 2003
Table 1B	Projected LOSSAN Corridor Train Traffic – Year 2020
Table 2	Estimated Locomotive Fuel Consumption Per Year
Table 3	Line Haul Locomotive Average Emission Factors
Table 4A	Estimated Locomotive Emissions for Passenger Trains – Year 2003
Table 4B	Estimated Locomotive Emissions for Passenger Trains – Year 2020
Table 5A	Estimated Locomotive Emissions for Freight Trains – Year 2003
Table 5B	Estimated Locomotive Emissions for Freight Trains – Year 2020
Table 6	Estimated Total Locomotive Emissions – Year 2003 and 2020
Table 7A	Total Train Miles by Air Basin – Year 2003
Table 7B	Total Train Miles by Air Basin – Year 2020
Table 8	Estimated Locomotive Fuel Consumption Per Year by Air Basin
Table 9A	Year 2003 – Estimated Locomotive Emissions for Passenger Trains by Air Basin
Table 9A	Year 2020 - Estimated Locomotive Emissions for Passenger Trains by Air Basin
Table 10A	Year 2003 – Estimated Locomotive Emissions for Freight Trains by Air Basin
Table 10B	Year 2020 - Estimated Locomotive Emissions for Freight Trains by Air Basin
Table 11	Estimated Total Locomotive Emissions by Air Basin - Year 2003 and 2020



**Table 1A  
LOSSAN Corridor Train Traffic - Year 2003**

Station	Distance (mi)	Passenger Trains										Freight Trains						
		Amtrak		Metrolink		NCTD		Total Miles			# Loco per Train	Total Weekly Loco Miles	BNSF* Daily	Total Miles			# Loco per Train	Total Weekly Loco Miles
		Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekly				Weekday	Weekend	Weekly		
Los Angeles Union Station	25	22	22	27	0	n/a	n/a	1225	550	7225	1	7225	45	1125	1125	7875	4	31500
Fullerton (MP 165.0)	7.6	22	22	27	0	n/a	n/a	372	167	2196	1	2196	7	53	53	372	4	1490
Orange (MP 172.6)	12.4	22	22	31	0	n/a	n/a	657	273	3832	1	3832	7	87	87	608	4	2430
Irvine (MP 185.0)	8	22	22	19	0	n/a	n/a	328	176	1992	1	1992	7	56	56	392	4	1568
Laguna Niguel (MP 193.0)	4.2	22	22	15	0	n/a	n/a	155	92	962	1	962	7	29	29	206	4	823
San Juan Capistrano (MP 197.2)	29.2	22	22	12	0	n/a	n/a	993	642	6249	1	6249	7	204	204	1431	4	5723
Oceanside (MP 226.4)	41.1	22	22	n/a	n/a	22	4	1808	1069	11179	1	11179	7	288	288	2014	4	8056
San Diego Santa Fe Depot (MP 267.5)																		
<b>TOTAL</b>	<b>127.5</b>											<b>33635</b>						<b>51590</b>

\*BNSF train traffic between Fullerton and Oceanside was estimated to be the same as the traffic between Oceanside and San Diego (7 trains per day). The majority of trains going south from LA Union Station go east at Fullerton, off of the LOSSAN corridor.

**Table 1B  
Projected LOSSAN Corridor Train Traffic - Year 2020**

Station	Distance (mi)	Passenger Trains										Freight Trains						
		Amtrak*		Metrolink**		NCTD***		Total Miles			# Loco per Train	Total Weekly Loco Miles	BNSF****	Total Miles			# Loco per Train	Total Weekly Loco Miles
		Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekly				Daily	Weekday	Weekend		
Los Angeles Union Station	25	32	32	54	0	n/a	n/a	2150	800	12350	1	12350	99	2475	2475	17325	4	69300
Fullerton (MP 165.0)	7.6	32	32	54	0	n/a	n/a	654	243	3754	1	3754	11	84	84	585	4	2341
Orange (MP 172.6)	12.4	32	32	54	0	n/a	n/a	1066	397	6126	1	6126	11	136	136	955	4	3819
Irvine (MP 185.0)	8	32	32	34	0	n/a	n/a	528	256	3152	1	3152	11	88	88	616	4	2464
Laguna Niguel (MP 193.0)	4.2	32	32	22	0	n/a	n/a	227	134	1403	1	1403	11	46	46	323	4	1294
San Juan Capistrano (MP 197.2)	29.2	32	32	17	0	n/a	n/a	1431	934	9023	1	9023	11	321	321	2248	4	8994
Oceanside (MP 226.4)	41.1	32	32	n/a	n/a	54	10	3535	1726	21125	1	21125	11	452	452	3165	4	12659
San Diego Santa Fe Depot (MP 267.5)																		
<b>TOTAL</b>	<b>127.5</b>											<b>56933</b>						<b>100870</b>

\*Amtrak 2020 projections based on Amtrak "California Passenger Rail Plan System 20 Year Improvement Plan" (date)

\*\*Metrolink 2020 projections based on SCRRRA 30 year Strategic Plan

\*\*\*NCTD 2020 projections based on SANDAG Regional Transportation Plan - 20 minute peak-headways, 60 minute off-peak-headways; assume weekend days would carry approximately 20% of weekday traffic (same ratio as 2003)

\*\*\*\*BNSF 2020 projections based on LAEDC Growth Rate Projections, July 2002 for the LA to Fullerton Segment; SANDAG 2020 population and employment forecasts for the Oceanside to San Diego Segment.

For the segments between Fullerton and Oceanside, the Oceanside-San Diego number was used (11 trains per day) to provide a high-end (conservative) estimate of freight traffic in these segments.

BNSF trains enter track at Redondo Jct. MP143.2

**Table 2**  
**Estimated Locomotive Fuel Consumption Per Year**

Rail Service Type and Year	Weekly Locomotive Miles	Annual Locomotive Miles	Ave. Miles Per Hour*	Annual Hours	Ave. Gallons Per Locomotive Hour*	Gallons per Year
<b>Passenger Trains</b>						
<b>2003</b>	33,635	1,749,010	70	24,986	85	2,123,797
<b>2020 (estimated)</b>	56,933	2,960,516	70	42,293	85	3,594,912
<b>Freight Trains</b>						
<b>2003</b>	51,590	2,682,680	50	53,654	110	5,901,896
<b>2020 (estimated)</b>	100,870	5,245,240	50	104,905	110	11,539,528

Source: Average miles per hour and gallons per hour, S. Fretwell, California Department of Transportation, Rail Division, Sacramento, California, personal communication with HDR, January 2003. Freight train fuel consumption is estimated, without confirmation from rail operators.

\* Fuel efficiency is expected to increase, and running time is expected to decrease by 2020. The train traffic in the LOSSAN corridor is projected to nearly double between 2003 and 2020, with or without the proposed rail t improvements to the corridor. Therefore, it was assumed for this analysis that the average speed would remain at approximately 2003 levels (with traffic nearly doubling) with the proposed improvements in place. Increases in fuel efficiency are speculative and therefore were not assumed for this analysis.

**Table 3**  
**Line Haul Locomotive Average Emission Factors**

Year	HC		CO		NOx		PM	
	grams/gal	lb/gal	grams/gal	lb/gal	grams/gal	lb/gal	grams/gal	lb/gal
<b>2003</b>	10	0.0220	26.6	0.0586	227.7	0.5019	6.7	0.0148
<b>2020</b>	7.4	0.0163	26.6	0.0586	136.9	0.3018	4.8	0.0106

Source: *Emission Factors for Locomotives*, United States Environmental Protection Agency, EPA420-F-97-051, December 1997, Tables 3 and 9.

**Table 4A**  
**Estimated Locomotive Emissions for Passenger Trains - Year 2003**

<b>Pollutant</b>	<b>Emissions Factor (lbs/gallon)</b>	<b>Gallons of Fuel per Year</b>	<b>Emissions tons/year</b>
<b>HC</b>	0.0220	2,123,797	23.41
<b>CO</b>	0.0586	2,123,797	62.27
<b>NOx</b>	0.5019	2,123,797	532.95
<b>PM</b>	0.0148	2,123,797	15.69
<b>SO2</b>	*	2,123,797	45.19
<b>CO2**</b>	22.3	2,123,797	23,680

**Table 4B**  
**Estimated Locomotive Emissions for Passenger Trains - Year 2020**

<b>Pollutant</b>	<b>Emissions Factor (lbs/gallon)</b>	<b>Gallons of Fuel per Year</b>	<b>Emissions tons/year</b>
<b>HC</b>	0.0163	3,594,912	29.26
<b>CO</b>	0.0586	3,594,912	105.41
<b>NOx</b>	0.3018	3,594,912	542.51
<b>PM</b>	0.0106	3,594,912	19.13
<b>SO2</b>	*	3,594,912	76.50
<b>CO2**</b>	22.3	3,594,912	40,083

\*SO2 emissions were estimated as follows:

Fuel density = 7.1 lb per gallon

Molecular weight of sulfur (S) = 32.064

Molecular weight of sulfur dioxide (SO2) = 64.0628

MW Ration = 64.0628/32.064 = 1.998

Fuel percent sulfur by weight = 0.3% (typical upper range)

(gallons of fuel) (7.1 lb/gal) (0.003) (1.998) = lbs of SO2/2000 = tons per year

\*\*CO2 emissions are based on 22,300 pounds per 1000 gallons of No. 2 oil (diesel fuel), from EPA Publication AP-42, Table 1.3-12.

Note: Decreases in the sulfur content of fuel is expected to decrease between now and 2020. While there are several planned reductions that will required for fuels purchases within California in the next several years, it cannot currently be determined whether and to what degree such requirements may apply to interstate locomotive travel in the future. Therefore, the sulfur content of fuel was left constant in this analysis for both 2003 and 2020.

**Table 5A**  
**Estimated Locomotive Emissions for Freight Trains - Year 2003**

Pollutant	Emissions Factor (lbs/gallon)	Gallons of Fuel per Year	Emissions tons/year
HC	0.0220	5,901,896	65.06
CO	0.0586	5,901,896	173.05
NOx	0.5019	5,901,896	1481.04
PM	0.0148	5,901,896	43.59
SO2	*	5,901,896	125.58
CO2**	22.3	5,901,896	65,806

**Table 5B**  
**Estimated Locomotive Emissions for Freight Trains - Year 2020**

Pollutant	Emissions Factor (lbs/gallon)	Gallons of Fuel per Year	Emissions tons/year
HC	0.0163	11,539,528	93.92
CO	0.0586	11,539,528	338.36
NOx	0.3018	11,539,528	1741.43
PM	0.0106	11,539,528	61.41
SO2	*	11,539,528	245.55
CO2**	22.3	11,539,528	128,666

**Table 6**  
**Estimated Total Locomotive Emissions - Year 2003 and 2020**

Pollutant	Total Emissions 2003 tons/year	Total Emissions 2020 tons/year	Difference tons/year	Percent Change
HC	88.47	123.17	34.70	39%
CO	235.33	443.77	208.44	89%
NOx	2,014.00	2,283.94	269.95	13%
PM	59.27	80.54	21.27	36%
SO2	170.78	322.04	151.26	89%
CO2**	89,486	168,749	79,263	89%

**Table 7A  
Total Train Miles by Air Basin - Year 2003**

Air Basin	Weekly Passenger Miles	Weekly Freight Miles	Total Weekly Locomotive Miles
South Coast	16,207	37,811	54,018
San Diego	17,428	13,779	31,207

**Table 7B  
Total Train Miles by Air Basin - Year 2020**

Air Basin	Weekly Passenger Miles	Weekly Freight Miles	Total Weekly Locomotive Miles
South Coast	26,785	79,218	106,002
San Diego	30,148	21,652	51,801

**Table 8  
Estimated Locomotive Fuel Consumption Per Year by Air Basin**

Rail Service Type and Year by Air Basin	Weekly Locomotive Miles	Annual Locomotive Miles	Ave. Miles Per Hour	Annual Hours	Ave. Gallons Per Locomotive Hour	Gallons per Year
<b>SOUTH COAST BASIN</b>						
<b>Passenger Trains</b>						
<b>2003</b>	16,207	842,754	70	12,039	85	1,023,344
<b>2020 (estimated)</b>	26,785	1,392,810	70	19,897	85	1,691,269
<b>Freight Trains</b>						
<b>2003</b>	37,811	1,966,182	50	39,324	110	4,325,601
<b>2020 (estimated)</b>	79,218	4,119,315	50	82,386	110	9,062,493
<b>SAN DIEGO BASIN</b>						
<b>Passenger Trains</b>						
<b>2003</b>	17,428	906,256	70	12,947	85	1,100,454
<b>2020 (estimated)</b>	30,148	1,567,706	70	22,396	85	1,903,643
<b>Freight Trains</b>						
<b>2003</b>	13,779	716,498	50	14,330	110	1,576,295
<b>2020 (estimated)</b>	21,652	1,125,925	50	22,518	110	2,477,035

Note: Division of train traffic between the South Coast and the San Diego Air Basins is approximate.

**Table 9A  
Year 2003**

**Estimated Locomotive Emissions for Passenger Trains by Air Basin**

Pollutant	Emissions Factor (lbs/gallon)	Gallons of Fuel per Year	Emissions tons/year
<b>SOUTH COAST BASIN</b>			
HC	0.0220	1,023,344	11.28
CO	0.0586	1,023,344	30.01
NOx	0.5019	1,023,344	256.80
PM	0.0148	1,023,344	7.56
SO2	*	1,023,344	21.78
CO2**	22.3	1,023,344	11,410.28
<b>SAN DIEGO BASIN</b>			
HC	0.0220	1,100,454	12.13
CO	0.0586	1,100,454	32.27
NOx	0.5019	1,100,454	276.15
PM	0.0148	1,100,454	8.13
SO2	*	1,100,454	23.42
CO2**	22.3	1,100,454	12,270.06

**Table 9B  
Year 2020**

**Estimated Locomotive Emissions for Passenger Trains by Air Basin**

Pollutant	Emissions Factor (lbs/gallon)	Gallons of Fuel per Year	Emissions tons/year
<b>SOUTH COAST BASIN</b>			
HC	0.0163	1,691,269	13.76
CO	0.0586	1,691,269	49.59
NOx	0.3018	1,691,269	255.23
PM	0.0106	1,691,269	9.00
SO2	*	1,691,269	35.99
CO2**	22.3	1,691,269	18,857.65
<b>SAN DIEGO BASIN</b>			
HC	0.0163	1,903,643	15.49
CO	0.0586	1,903,643	55.82
NOx	0.3018	1,903,643	287.28
PM	0.0106	1,903,643	10.13
SO2	*	1,903,643	40.51
CO2**	22.3	1,903,643	21,225.62

\*SO2 emissions were estimated as follows:

Fuel density = 7.1 lb per gallon

Molecular weight of sulfur (S) = 32.064

Molecular weight of sulfur dioxide (SO2) = 64.0628

MW Ratio = 64.0628/32.064 = 1.998

Fuel percent sulfur by weight = 0.3% (typical upper range)

(gallons of fuel) (7.1 lb/gal) (0.003) (1.998) = lbs of SO2/2000 = tons per year

\*\*CO2 emissions are based on 22,300 pounds per 1000 gallons of No. 2 oil (diesel fuel),  
from EPA Publication AP-42, Table 1.3-12.

**Table 10A  
Year 2003**

**Estimated Locomotive Emissions for Freight Trains by Air Basin**

<b>Pollutant</b>	<b>Emissions Factor (lbs/gallon)</b>	<b>Gallons of Fuel per Year</b>	<b>Emissions tons/year</b>
<b>SOUTH COAST BASIN</b>			
HC	0.0220	4,325,601	47.68
CO	0.0586	4,325,601	126.83
NOx	0.5019	4,325,601	1085.48
PM	0.0148	4,325,601	31.95
SO2	*	4,325,601	92.04
CO2**	22.3	4,325,601	48,230.45
<b>SAN DIEGO BASIN</b>			
HC	0.0220	1,576,295	17.38
CO	0.0586	1,576,295	46.22
NOx	0.5019	1,576,295	395.56
PM	0.0148	1,576,295	11.64
SO2	*	1,576,295	33.54
CO2**	22.3	1,576,295	17,575.69

**Table 10B  
Year 2020**

**Estimated Locomotive Emissions for Freight Trains by Air Basin**

<b>Pollutant</b>	<b>Emissions Factor (lbs/gallon)</b>	<b>Gallons of Fuel per Year</b>	<b>Emissions tons/year</b>
<b>SOUTH COAST BASIN</b>			
HC	0.0163	9,062,493	73.76
CO	0.0586	9,062,493	265.73
NOx	0.3018	9,062,493	1367.62
PM	0.0106	9,062,493	48.23
SO2	*	9,062,493	192.84
CO2**	22.3	9,062,493	101,046.80
<b>SAN DIEGO BASIN</b>			
HC	0.0163	2,477,035	20.16
CO	0.0586	2,477,035	72.63
NOx	0.3018	2,477,035	373.81
PM	0.0106	2,477,035	13.18
SO2	*	2,477,035	52.71
CO2**	22.3	2,477,035	27,618.94

**Table 11  
Estimated Total Locomotive Emissions by Air Basin - Year 2003 and 2020**

<b>Pollutant</b>	<b>Total Emissions 2003 tons/year</b>	<b>Total Emissions 2020 tons/year</b>	<b>Difference tons/year</b>	<b>Percent Change</b>
<b>SOUTH COAST BASIN</b>				
<b>HC</b>	58.96	87.52	28.56	48%
<b>CO</b>	156.84	315.32	158.48	101%
<b>NOx</b>	1,342.28	1,622.85	280.57	21%
<b>PM</b>	39.50	57.23	17.73	45%
<b>SO2</b>	113.82	228.83	115.01	101%
<b>CO2**</b>	59,640.74	119,904.45	60,263.71	101%
<b>SAN DIEGO BASIN</b>				
<b>HC</b>	29.51	35.65	6.15	21%
<b>CO</b>	78.49	128.45	49.96	64%
<b>NOx</b>	671.71	661.09	-10.62	-2%
<b>PM</b>	19.77	23.31	3.54	18%
<b>SO2</b>	56.96	93.22	36.26	64%
<b>CO2**</b>	29,845.75	48,844.56	18,998.82	64%

## **APPENDIX 3.4-A**

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### **NOISE AND VIBRATION SCREENING DISTANCES**



**Table 3.4-A-1  
Noise Screening Distances for Rail Improvement Alternative**

Speed (miles per hour)	Type of Corridor	Land Use—Ambient	Distance <sup>1</sup> (feet)
≥125	Existing Rail	Urban/Noisy Suburban	450
		Quiet Suburban/Rural	900
	Existing Highway	Urban/Noisy Suburban	450
		Quiet Suburban/Rural	700
	New Rail	Urban/Noisy Suburban	450
		Quiet Suburban/Rural	900
<125	Any	Urban/Noisy Suburban	375
		Quiet Suburban/Rural	750
Station <sup>2</sup>	Any	Urban/Noisy Suburban	225
		Quiet Suburban/Rural	450

Ambient noise threshold for suburban/rural is 55 to 60 day-night average level (L<sub>dn</sub>).  
<sup>1</sup> Measured from centerline of track.  
<sup>2</sup> For a distance of 0.25 mile in either direction from center of station.

**Table 3.4-A-2  
Vibration Screening Distances for Rail Improvement Alternative**

Speed (miles per hour)	Receptor Type	Distance* (feet)
≥125	Special Facilities (e.g., concert halls, research)	750
	Residential	220
	Institutional (e.g., schools, public buildings)	160
<125	Category 1 (e.g., concert halls, research)	600
	Category 2 (e.g., residences, theaters, auditoria)	200
	Category 3 (e.g., schools, public buildings)	120

\* Measured from centerline of track.



## **APPENDIX 3.4-B**

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### **NOISE AND VIBRATION RATING METHOD**



For this screening study, an impact metric (IM) and impact rating (IR) have been defined as follows:

$$\text{Impact Metric (IM)} = R + 0.3 \text{ MU} + 100 \text{ H} + 250 \text{ S},$$

Where:

**R** = number of people impacted per mile in areas with residential land use (per the Federal Railroad Administration's [FRA's] "Severe" and "Impact" categories),

**MU** = number of people potentially impacted per mile in mixed commercial/residential land use,

**H** = number of hospitals per mile, and

**S** = number of schools per mile.

The calculations are based on the number of people estimated to be within the screening distance in a segment, divided by the number of route miles associated with that segment. Each term in the IM equation is given a weighting based on the estimated number of people associated with that sensitive site. For example, the 0.3 factor accounts for land usage other than residential and is appropriate because the population density is based on census tracts and covers a wider area than just the mixed land use. The 100 and the 250 factors are an estimated average number of people affected in each type of facility. There may be more people in each facility, but only 1 to 3 sides of the building(s) would be exposed to noise.

The numbers obtained from the IM equation are used to determine a rating for each segment based on the following noise rating scheme (IR):

High (H) =  $IM > 200$ ;

Medium (M) =  $80 < IM < 200$ ;

Low (L) =  $IM < 80$ .

Similarly, the same method is used to develop a vibration rating scheme (IR):

High (H) =  $IM > 100$ ;

Medium (M) =  $40 < IM < 100$ ;

Low (L) =  $IM < 40$ .

Implications of the rating scheme for noise as defined in this manner are that an IR of low (L) with IM less than 80 corresponds to a residential impact of four people per house and 20 houses per mile (520 feet between houses for development on both sides of the alignment), and no institutional impacts. Because of their higher occupancy, institutional impacts add substantially to the impact rating.



## **APPENDIX 3.4-C**

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### **NOISE AND VIBRATION IMPACT CRITERIA**



## NOISE IMPACT CRITERIA

The Federal Railroad Administration's (FRA's) noise criteria are ambient-based, such that a rail project's noise is compared with existing conditions to provide an assessment of the effect of the potential change in noise environment on various land uses in the transportation corridor.<sup>1</sup> The assessment of project noise levels incorporates elements of both "relative" and "absolute" limits. Relative criteria are based on expected annoyance due to the change in the noise environment. Absolute criteria are based on activity interference such as interfering with speech (listening to radio or television) or arousing from sleep.

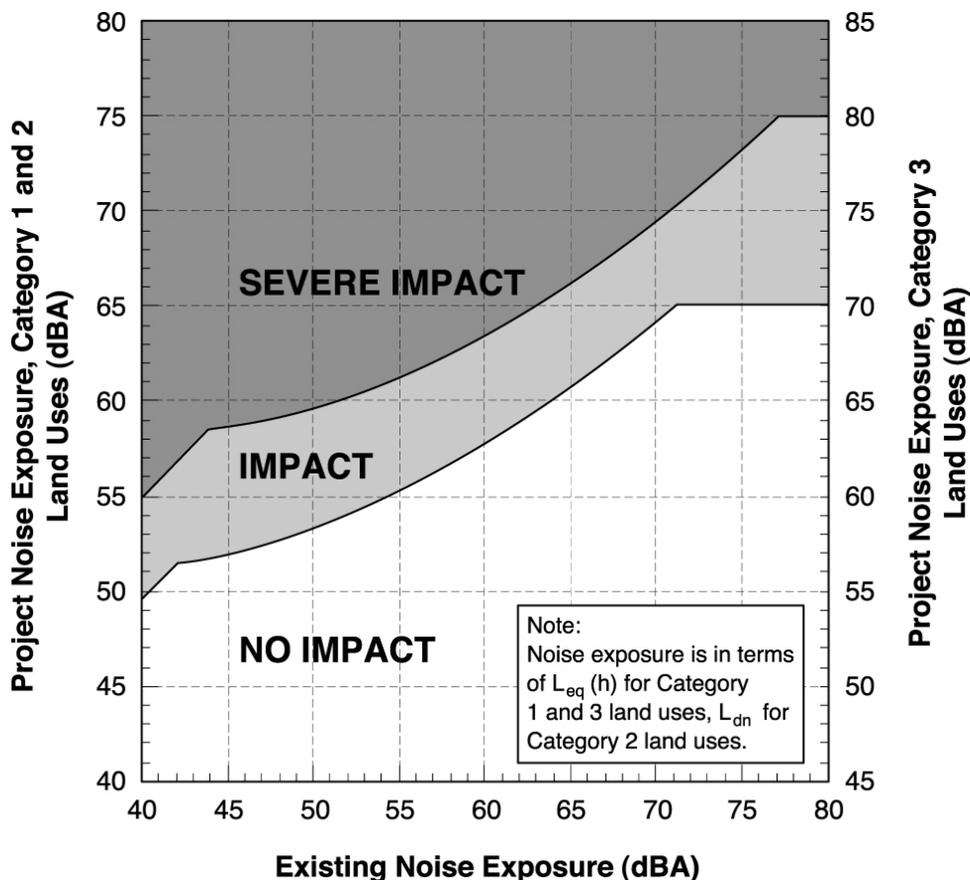
The figure used for noise impact assessment is the day-night sound level ( $L_{dn}$ ) measured in decibels (dBA) for residential land uses, Land Use Category 2, including buildings where people sleep (residences, hospitals, hotels, motels). The hourly equivalent sound level ( $L_{eq}$ ) in dBA is applied during hours of active use in parks (Land Use Category 1) and institutional uses (Land Use Category 3—churches, libraries, schools).

The FRA categorizes changes in noise over existing conditions in three levels of effect: *no impact*, *impact*, and *severe impact*. The noise levels for alternatives are compared to the existing ambient noise level prior to the introduction of the alternative. The intersection of the two levels on the graph in Figure 3.4-C-1 is an indicator of the degree of impact. Below the threshold of *impact*, the alternative would have *no impact* on noise since, on the average, there would be an insignificant increase in the number of people highly annoyed by the new noise from the alternative. For *severe impact*, a significant percentage of the people exposed to the noise would be highly annoyed by the new noise source. *Impact* is assessed when the noise level would be noticeable but would not be sufficient to cause strong, adverse reactions from the community. Upper limits are included in the FRA criteria to account for high noise levels judged to interfere with human activities.

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<sup>1</sup> U.S. Department of Transportation, Federal Railroad Administration. "High Speed Ground Transportation Noise and Vibration Impact Assessment". Washington DC: 1998.

**Figure 3.4-C-1  
Noise Impact Criteria for High-Speed Rail Projects**



**VIBRATION IMPACT CRITERIA**

**Table 3.4-C-1  
Ground-Borne Vibration Impact Criteria**

Land Use Category	Ground-Borne Vibration Impact Levels (VdB re 1 micro inch/sec)	
	Frequent Events <sup>1</sup>	Infrequent Events <sup>2</sup>
Category 1: Buildings where low ambient vibration is essential for interior operations.	65 <sup>3</sup>	65 <sup>3</sup>
Category 2: Residences and buildings where people normally sleep	72	80
Category 3: Institutional land uses with primarily daytime use.	75	83

Notes:  
VdB re 1 micro inch/sec = velocity level in decibel units re one micro-inch per second.  
<sup>1</sup> Frequent events are defined as more than 70 vibration events per day. Most rapid transit projects fall into this category.  
<sup>2</sup> Infrequent events is defined as fewer than 70 vibration events per day. This category includes most commuter rail systems  
<sup>3</sup> This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration sensitive manufacturing or research will require detailed evaluation to define acceptable vibrations levels. Ensuring lower vibration levels in a building often requires special design of the heating/air conditioning systems and stiffened floors.

## **APPENDIX 3.10-A**

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**LETTER TO STATE HISTORIC PRESERVATION OFFICE**

The following letters from the Federal Railroad Administration (FRA) to the California State Historic Preservation Office (SHPO) was written in connection with the statewide High-Speed Train Program sponsored by the California High-Speed Rail Authority. (The statewide program is described in Chapter 2, Alternatives, of this Program EIR/EIS.)

The LOSSAN rail corridor was evaluated as a sub-set of the statewide program, so the designation of an APE for the statewide program applied to the LOSSAN region as well as the other regions involved in the statewide study. A separate consultation process would be completed by the Department if the LOSSAN conventional rail improvements program moves forward into the project-level assessment stage.



U.S. Department  
of Transportation  
**Federal Railroad  
Administration**

400 Seventh St., S.W.  
Washington, D.C. 20590

NOV 15 2002

Dr. Knox Mellon  
State Historic Preservation Officer  
Office of Historic Preservation  
P.O. Box 942896  
Sacramento, CA 94296-0001

**Subject: Program EIR/EIS for Proposed California High Speed Rail Program**

Dear Dr. Mellon:

The Federal Railroad Administration (FRA) wishes to initiate consultation with you under Section 106 of the National Historic Preservation Act as part of the environmental review process for the proposed California High Speed Rail Program. The FRA and the California High Speed Rail Authority (Authority) in partnership have begun the preparation of a Program (EIR/EIS) for a proposed High Speed Rail System connecting the major urban centers of California. This initial phase of environmental review will evaluate system alternatives and alternative high speed rail routes. Later phases of this tiered review process will evaluate site-specific environmental impacts as appropriate.

The FRA and the Authority have concluded that implementation of the High Speed Rail Program is likely to involve Federal actions under the National Environmental Policy Act and Federal undertakings under the National Historic Preservation Act, including possible railroad safety regulatory actions, approvals to cross Federally-owned land and rights of way, and potential Federal financial support. The FRA, an operating administration with the United States Department of Transportation, is serving as lead Federal agency. The Authority, a state agency established by the state Legislature and authorized to plan, construct, and operate a high speed rail system in California (See Cal. Public Utilities Code section 185000 et seq.), will be the lead agency for the state (CEQA) review. The FRA is authorizing the Authority to initiate consultations with your office for this program in accordance with 36 C.F.R. 800.2(c)(4). However, FRA will remain legally responsible for all Section 106 findings and determinations. Because to the best of our knowledge, the undertaking will not affect any tribal lands, as defined in 36 C.F.R. 800.16(x), it does not appear that it will be necessary to initiate consultation with Tribal Historic Preservation Officers, [36 C.F.R. 800.3(d)].

We propose a phased identification effort, as provided for in 36 CFR 800.4(b)(2). Initial steps to identify historic properties will be taken as part of the current Program EIR/EIS [36 CFR 800.4(a)]. We suggest that in the near future we designate an appropriate area of potential effects (APE) for this undertaking [36 CFR 800.4(a)(1)] in relation to the proposed corridors and locations, which typically follow existing railroad alignments and highway routes or are adjacent to existing airports. Records searches for the APE will be obtained from the appropriate Information Centers of the California Historical Resources Information System. For resources that are integral to the alternatives, such as LA Union Station, additional consultation will take place with local historic preservation interests. In addition, the Native American Heritage Commission will be asked to search its Sacred Lands file and to provide lists of Native American

contacts for the APE. Letters will be sent to the appropriate Native American contacts on the lists. The letters will provide information about the project and request information about any traditional cultural properties, which could be affected by the project [36 CFR 800.4(a)(4)].

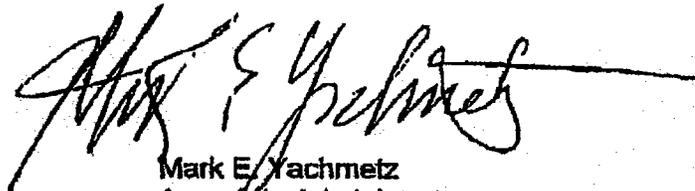
We will shortly be asking for your review of the historic and archeological assessment methodologies proposed for use in this effort. The Authority divided the statewide system into five regions and has consulting teams for each region, who will prepare environmental impact assessments. They will rank the sensitivity (high, medium, or low) of the alternatives being studied in the Program EIR/EIS using the results of the records searches, combined with knowledge of the prehistory and history of the region. This information will be provided in a technical report and summarized in the programmatic EIR/EIS. The FRA and the Authority will involve the public through the EIR/EIS process [36 CFR 800.2(d)(3); 36 CFR 800.3(e)].

Other identification steps, including field surveys, would be performed after the Program EIR/EIS has been completed and routes have been selected for further engineering detail and environmental evaluation. These later identification efforts would be part of project-specific environmental reviews for the specific routes and are not part of the current undertaking.

We request your comments on our proposed implementation of the first steps in the Section 106 process for this undertaking. FRA would also suggest that it might be appropriate for the FRA, the Authority, and the Office of Historic Preservation to enter into a Programmatic Memorandum of Agreement at the conclusion of this Program EIR/EIS process, which would guide second tier environmental studies. We look forward to your consideration of this step and to the consultative process for this regionally significant project.

The FRA point of contact regarding this consultation will be Mr. David Valenstein, Environmental Program Manager, who can be reached at (202) 493-6368 or by email [david.valenstein@fra.dot.gov]. Please contact him should you have any questions or concerns about this program. The California High Speed Rail Authority may be reached by telephone at (916) 324-1541 and will follow this letter with additional correspondence.

Sincerely,



Mark E. Yachmetz  
Associate Administrator  
For Railroad Development

CC: California High Speed Rail Authority



U.S. Department  
of Transportation

**Federal Railroad  
Administration**

1120 Vermont Ave., N.W.  
Washington, D.C. 20590

**FEB 10 2003**

Dr. Knox Mellon  
State Historic Preservation Officer  
Office of Historic Preservation  
P.O. Box 942896  
Sacramento, CA 94296-0001

**Subject: APE for California High-Speed Train Program EIR/EIS**

Dear Dr. Mellon:

As identified in the November 15, 2002 letter from the Federal Railroad Administration (FRA) and in discussions with your staff, the FRA and the California High-Speed Rail Authority are preparing a Programmatic Environmental Impact Report/Environmental Impact Statement (Program EIR/EIS) as part of the environmental review process for the California High-Speed Rail Program. Initial steps to identify historic properties will be taken as part of this process in order to help evaluate system alternatives and alternative high-speed train routes.

For this Program level EIR/EIS, the Area of Potential Effect (APE) will define the area for which records search information for archaeological sites will be collected, and the area that will be used to help evaluate the relative magnitude of potential effects to historic and cultural resources at this Tier-1 program phase of analysis. Any traditional cultural properties identified by the Native American Heritage Commission or Native Americans contacted about the project will be considered, whether or not they are in the APE used for the records searches at the Information Centers.

Several of the potential high-speed train routes that we are studying are located along existing railroad and freeway rights-of-way. In addition, we are evaluating a modal alternative that includes improvements to a number of existing airports and freeways. For the high-speed train alternative, we propose that the APE be defined as 500 feet on each side of the centerline of proposed high-speed train routes in non-urban areas and 100 feet from the centerline in urban areas. For the modal alternative, we propose that the APE for freeway routes and around airports be defined as 100 feet beyond the existing freeway right-of-way and 100 feet beyond the existing airport property boundary. The reason we propose using 100 feet for urban rail corridors is that very little additional right-of-way would be affected in these areas. Because freeway and airport capacity enhancements expand existing facilities, they too would require very little additional right-of-way. The use of 500 feet on each side of the high-speed train centerline in non-urban areas will provide information on wider corridors where additional right-of-way could be affected.

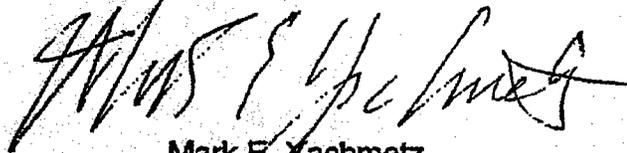
We have not yet identified locations of easements and construction-related facilities, such as equipment staging areas, borrow and disposal areas, access roads, and utilities. We expect to do so as part of the construction design program for the alternatives selected for

more detailed analysis in the next phase of the project. Thus, we will not consider these items in the program level Tier-1 analysis, but we would have this information for Tier-2 site-specific EIR/EIS's. The APE would be modified to include these items as part of the Tier-2 analysis.

We will likewise not be collecting information from the Historic Property Data File and other sources that provide addresses of individual historic structures at this program phase. The potential relative magnitude of effects on historic structures from the various alternatives will be evaluated based on the percentage of each alternative route that developed in various time periods (before 1900, 1900 to 1929, and 1930 to 1958). Potential impacts to specific resources would be assessed as part of a subsequent Tier-2 analysis.

We request your concurrence with the APE boundaries we have proposed for this program phase of the undertaking. We appreciate the cooperation we have received from your staff as we have consulted with them with respect to the appropriate APE definition and our approach to structuring the analyses to be conducted at the Tier-1 and Tier-2 phases of this important statewide project. Should you have any questions or concerns regarding this request, please contact Mr. David Valenstein at (202) 493-6368.

Sincerely,



Mark E. Yachmetz  
Associate Administrator  
For Railroad Development

CC: D. Valenstein, FRA  
D. Leavitt, CAHSRA  
K. Field, PB  
M. Duffey, DC  
R. Mason, CG



## **APPENDIX 3.13-C**

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### **DATA COLLECTION FOR NATURAL RESOURCES**



Natural resource data collection efforts focused on vegetation communities, jurisdictional wetlands, other sensitive habitats including stream crossing and riparian zones, hydric soils, and serpentine (ultramafic) soils; wildlife movement corridors, and threatened, endangered, and sensitive (TES) species and their habitat requirements. TES species are also termed special-status species, particularly those not identified under the federal Endangered Species Act or California Endangered Species Act.

Plant taxonomy and nomenclature followed Abrams (1923, 1944, 1951), Abrams and Ferris (1960), Buckingham et al. (1995), Munz (1959), Hickman (1993), and Hitchcock et al. 1969). Scientific nomenclature and common names for wildlife follows: butterflies, Miller (1992); fish, Robins et al. (1991); herpetofauna (amphibians and reptiles), Committee on Standard English and Scientific Names (2001); birds, American Ornithologists' Union (1983, 1998); and mammals, Wilson and Cole (2000).

Geospatial data (GIS) based on the California GAP analysis (Davis 1998), which uses the CWHR classification (Zeiner et al. 1988; 1990a; 1990b), was used as the primary source for delineation of vegetation communities along the Rail Improvement alignment options. However, the preferred analysis classification is based on Holland (1986). The most recent vegetation classification for California (Sawyer and Keeler-Wolf 1995) was not used because this data is not available in geospatial contexts.

Geospatial data for TES and special status species was obtained from the CNDDDB (California Department of Fish and Game 2002). There were no data available from the CNPS (California Native Plant Society 2001) or species-specific publications.

A delineation of wetlands and other waters of the U.S. was not conducted for this analysis. The type and extent of jurisdictional wetlands within the study areas was evaluated through GIS analysis of digital wetlands data from the National Wetland Inventory (NWI). NWI is maintained by the U.S. Fish and Wildlife Service (USFWS) to provide information on the characteristics, extent, and status of the nation's wetlands and deepwater habitats. NWI digital data files are records of wetlands location and classification as developed by the USFWS. The classification system was adopted as a national classification standard in 1996 by the Federal Geographic Data Committee. The location of the wetlands is mapped on U.S. Geologic Survey (USGS) 7.5 minute topographic quadrangle maps with codes that provide information on the water body type and substrate.

The NWI maps do not show all wetlands because the maps are derived from aerial photo interpretation with varying limitations due to scale, photo quality, inventory techniques, and other factors. Consequently, the maps tend to show wetlands that are readily photo-interpreted given consideration of photo and map scale. In general, the older NWI maps prepared from 1970s-era black and white photography (1:80,000 scale) tend to be very conservative, with many forested and drier-end emergent wetlands not mapped. Maps derived from color infrared photography tend to yield more accurate results except when this photography was captured during a dry year, making wetlands identification equally difficult. Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory.

There were no geospatial data available for riparian corridors. However, the presence of streams (with corresponding indeterminate riparian vegetation) was determined from a manual review of USGS quadrangle maps, and was inferred from geospatial results of California GAP Analysis and CNDDDB for specific riparian vegetation polygons.

GIS data was exported to MS Excel spreadsheets. These spreadsheets were sorted using the desired parameter in ascending order, and the acreages of like attributes were arithmetically summed using MS Excel. Attributes and MS Excel sums were transferred to the summary tables

There were no geospatial data available identifying specific wildlife corridors in the LOSSAN study area. Therefore, for this program-level evaluation, large, open areas, lagoons and surrounding park or reserve areas, and riparian corridors in undeveloped areas were considered to be potential wildlife movement corridors.

## **APPENDIX 3.13-D**

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### **DESCRIPTION OF LAGOONS IN STUDY AREA**

## Buena Vista Lagoon

The Buena Vista Lagoon, approximately 223 acres in size, lies within the cities of Carlsbad and Oceanside in northern San Diego County. The lagoon consists of both state and privately owned lands with the majority owned by the CDFG. The CDFG property is a designated Ecological Reserve as described in Title 14, Section 630 of the California Administrative Code, due to the unique habitat and number of wildlife species that use the area, including threatened and endangered species. The reserve permits fishing and passive recreation. The lagoon is also designated as Open Space per the 1995 amended City of Oceanside zoning ordinance and 1991 City of Carlsbad zoning ordinance. In March 2001, CDFG purchased a 10-acre parcel adjacent to the north shore of the lagoon with funding from the Wildlife Conservation Board. CDFG anticipates using this land as buffer and, in the short-term, as a staging area for restoration activities (Wootten 2002).

Habitats present in or within the vicinity of Buena Vista Lagoon include, but are not limited to, open water, seasonal sand/mud flats, brackish/freshwater marsh, some coastal salt marsh, a small riparian corridor, and Diegan coastal sage scrub.

Since the mid-1970s, urban development immediately surrounding Buena Vista Lagoon and on the Buena Vista Creek floodplain has put considerable pressure on the hydrology and ecological features of the lagoon. The lagoon has suffered declining water quality, accelerated sedimentation, diminished biological productivity, and constraints on water circulation caused by structures across the lagoon, including a weir at the mouth. Formerly, tidal influence occurred periodically when winter floods breached the barrier beach at the mouth. Over time, however, particularly since the installation of the weir in 1948, the lagoon has slowly become more of a freshwater system. The lagoon was also included on the 303(d) list of impaired water bodies in 1998 due to exceeding standards for nutrients, sediment and coliform bacteria. Several plans have been prepared to address these issues.

The problem of accumulated sedimentation in the Buena Vista Lagoon resulted in the California Coastal Conservancy (Conservancy) initiating a sediment control program in the Buena Vista Creek Watershed (Browne and Vogt 1982). A Joint Powers Committee (JPC) was established by the cities of Oceanside, Carlsbad, and Vista in 1983. That same year, a \$1 million project administered by the City of Carlsbad was initiated to excavate excess sediment in the eastern end of the lagoon and create two least tern-nesting islands (Buena Vista Lagoon Foundation 1983). All three jurisdictions adopted an erosion control ordinance in 1984.

The Buena Vista Lagoon (BVL) Foundation prepared a plan in 1983 to structure implementation of their founding objectives which include conserving and restoring the lagoon marsh and wetlands and act as ongoing guardian of the lagoon. The plan identifies a range of actions including monitoring water quality, sedimentation rates and vegetation. The plan also includes acquiring small aquatic habitat areas not in the ecological reserve.

CDFG developed an interim management plan in 1991 for the lagoon that outlines the purposes and objectives of the ecological reserve, identifies fish and wildlife resources and public access facilities, and describes intended management objectives and activities.

The Buena Vista Lagoon JPC prepared a Strategic Plan (Buena Vista JPC Lagoon 1996) to improve the environmental conditions within the lagoon. Among the action items are several strategies to enhance and protect fish, wildlife and their habitat. Also included is a proposal to dredge the organic burden from the bed of the lagoon and to modify the weir to reduce freshwater discharge flows across the beach and provide greater ability to manage floods. One

design would enable some tidal infusion of seawater into the lagoon to create local brackish water conditions.

To date, enhancement proposals have been constrained by the lack of a comprehensive plan for a sustainable hydrologic system and conflicting assumptions about what such a system should include (Wootten 2002). Currently, the BVL Foundation is conducting a restoration feasibility analysis to identify feasible, cost-effective, and ecologically beneficial restoration scenarios for the lagoon. Alternatives include various hydrological regimes including leaving the lagoon in its current condition, implementing minimal structural changes to maintain a freshwater regime, implementing structural changes that would result in a brackish regime, or implementing structural changes that would result in a saltwater regime.

### **Agua Hedionda Lagoon**

The Agua Hedionda Lagoon, approximately 330 acres in size, lies within the City of Carlsbad, off Carlsbad Boulevard. In the 1950s, San Diego Gas and Electric constructed the Encina Power Plant and a tidal basin to provide its cooling water. The tidal basin is the Agua Hedionda Lagoon, currently owned (as of 2001) by NRG Cabrillo Power (Soczka pers. comm. 2002). Cabrillo Power leases a portion of its acres to the YMCA, the City of Carlsbad, and private businesses. The area is designated as open space in both the general plan and zoning ordinance for the City of Carlsbad.

Habitats present in or within the vicinity of the Agua Hedionda Lagoon include, but are not limited to, open water, brackish/freshwater, mudflats, estuarine flats, patchy salt marsh areas, riparian, and Diegan coastal sage scrub.

The lagoon is subject to full tidal influence. The original slough was only occasionally open to the sea. An inlet channel of riprap jetties, which keeps the mouth permanently open, was built in 1954. The lagoon consists of three basins that are connected via openings under I-5 and the railroad. However, the berms for these crossings may limit the reach of tidal action (CERES 2002). Freshwater enters the lagoon from urban runoff along the northern shore, agricultural runoff from along the southern shore, and 23 storm drains.

Pressures on the Agua Hedionda Lagoon include sedimentation from agricultural and urban development in the watershed, sedimentation entering the outer areas of the lagoon due to longshore drift, potential impacts on habitats and wildlife from active recreation and adjacent development, and impacts to water circulation from the power plant and structures across the lagoon (CERES 2002). The lagoon was included on the 303(d) list of impaired water bodies in 1998 due to exceeding standards for sediment and coliform bacteria.

In 1985, a mitigation project involving restoration of several wetland habitats was undertaken but considered unsuccessful (CERES 2002). Although no major restoration program is currently operating in or near the lagoon (Soczka pers. comm. 2002), several activities have been implemented in an attempt to improve lagoon conditions. The City of Carlsbad has a Master Drainage and Stormwater Quality Management Plan and implements an erosion control ordinance for all construction projects. There is no formal program to address sediment from agricultural activities. To remove sediment, dredging is an ongoing activity and is the responsibility of NRG Cabrillo Power. The frequency of dredging activities may need to increase due to a nearby beach nourishment project (Soczka pers. comm. 2002). Cabrillo Power has also been responsible for the planting and monitoring of eelgrass as mitigation for their dredging activities (Soczka pers. comm. 2002). Recently, the Agua Hedionda Lagoon Foundation, in partnership with NRG Cabrillo Power, CDFG, the National Marine Fisheries

Service, and the regional Water Quality Control Board implemented a program to eradicate a non-native, highly invasive tropical algae (*Caulerpa taxifolia*) from the Agua Hedionda Lagoon (EPA website 2002). Because of the ability of *Caulerpa* to rapidly spread, continual surveillance is planned over the next several years in an attempt to detect small patches of this species of algae.

### **Batiquitos Lagoon**

The Batiquitos Lagoon, approximately 600 acres in size, is located at the southern edge of the City of Carlsbad. The California State Lands Commission owns the majority of the lagoon acreage although property is leased to CDFG which also owns a smaller lagoon parcel. Currently the Port of Los Angeles also owns approximately 30-40 acres that will be conveyed to the state as part of an enhancement program. In 1983, the lagoon was made a CDFG State Ecological Reserve. Passive recreation is the predominant use, with two trails along the north shore of the lagoon. The area is designated as Open Space in the general plan for the City of Carlsbad.

Habitats present in or within the vicinity of Batiquitos Lagoon include, but are not limited to, open water, estuarine flats, coastal salt marsh, brackish emergent marsh, riparian, and Diegan coastal sage scrub.

Once a tidal system, the lagoon has largely been non-tidal since the 1900s. By the early 1980s, the lagoon had achieved an advanced state of sedimentation and eutrophication resulting in natural habitat declines. Local recognition of the accelerating decline of the system led to establishment of an enhancement group and initiation of restoration planning through funding by the Conservancy. In 1987 the Port of Los Angeles (Port), City of Carlsbad, U.S. Fish and Wildlife Service, National Marine Fisheries Service, CDFG, and State Lands Commission signed an interagency agreement pertaining to the restoration of Batiquitos Lagoon for mitigation credits to be applied to impacts associated with Outer Los Angeles Harbor development by the Port (Merckel & Associates 1999). In 1989, the City of Carlsbad and the Port completed a sediment load study that concluded that inadequate tidal flushing was a greater factor in the rapid filling of the lagoon than sedimentation from upland sources.

The lagoon restoration spanned three years (1994-1996) and consisted of dredging, jetty construction, and infrastructure improvements. Work was completed with the permanent mouth opening in 1996. Upon final construction the lagoon was turned over to CDFG. CDFG is responsible for long-term maintenance using a maintenance account provided by the Port (Merckel & Associates 1999). Long-term biological monitoring of biological resources and water quality is being carried out by the City of Carlsbad and the Port. A report summarizing the success over the last five years of the enhancement work was to be released in 2003.

### **San Elijo Lagoon**

The San Elijo Lagoon, approximately 600 acres in size, is located between the cities of Encinitas and Solana Beach. Primary ownership of the lagoon is retained by San Diego County Parks and Recreation (County), CDFG, and California State Lands Commission (Enriquez pers. comm. 2003). The area is designated as Open Space and Reserve in the general plan for the City of Encinitas. CDFG, with the assistance of the County, manages the San Elijo Lagoon as an Ecological Reserve. The Reserve, including the wetlands acreage, encompasses approximately 900 acres and includes five miles of trails. The Reserve also accommodates passive recreation and fishing in selected areas.

Habitats present in or within the vicinity of San Elijo Lagoon include, but are not limited to, open water (estuarine and fresh), sand/mudflats, coastal salt marsh, fresh/brackish marsh, riparian, and Diegan coastal sage scrub. I-5, the railroad, and Highway 101 divide the lagoon into three basins that are then connected by narrow channels confined by bridge abutments. Over the past several decades, the biological resources of the San Elijo Lagoon have deteriorated because of severely limited tidal action, hydrological and land use changes to the watershed, urbanization, sedimentation, poor water quality, introduction of exotic species, and increased visitor usage and off-road vehicle activity. The lagoon was included on the 303(d) list of impaired water bodies in 1998 due to exceeding standards for eutrophication, sediment and coliform bacteria.

A draft Enhancement Plan, prepared by the County in 1995, recommended methods to preserve and augment a gradient of self-sustaining habitats that range from salt marsh to freshwater marsh. The long-range plan for the area is to continue to provide for the habitat needs of wildlife while maximizing passive recreational and educational opportunities for the public. The plan recommends opening the mouth regularly or to maintain an opening permanently and increase tidal circulation to the lagoon, all of which would greatly restore tidal and salt marsh habitat. Enrichment of brackish and freshwater marsh areas, removal of exotic species, revegetation of degraded areas, and closing of unnecessary trails through sensitive habitats are proposed to maximize existing values. (County of San Diego 1995).

### San Dieguito Lagoon

The San Dieguito Lagoon, approximately 260 acres in size, is located at the northern edge of the City of Del Mar and at the western end of the San Dieguito River Valley.

Primary ownership of the lagoon is retained by CDFG, San Dieguito River Park Joint Powers Authority, Southern California Edison (SCE), the cities of Del Mar and San Diego, and the 22nd Agricultural District. A major portion of the area owned by CDFG is a State Ecological Reserve, located in the southern corner of the historic wetlands just west of I-5. The lagoon is designated as Open Space in the City of San Diego general plan.

Habitats present in or within the vicinity of San Dieguito Lagoon include, but are not limited to, open water, estuarine/palustrine flats, salt marsh, brackish/freshwater marsh, coastal salt marsh, riparian scrub, and Diegan coastal sage scrub.

The San Dieguito Lagoon was once the largest of the six San Diego County coastal lagoons. A constrained ocean inlet, the railroad berm, and I-5 significantly restrict tidal flow. San Dieguito River flow is intermittent and the riverbed is often dry; however this intermittent flow of freshwater occurs upstream of the tidal influence. Concerns over structural constraints on the reach of tidal flow, retention of freshwater flows, flood control, sedimentation, and exotic vegetation resulted in the San Dieguito Lagoon Resource Enhancement Program of 1979. In 1983, a portion of the enhancement program was implemented using a grant from the Conservancy and involving dredging a new tidal basin just south and west of I-5. The river mouth was also opened to restore tidal influence, at least temporarily, to the entire coastal wetland (San Dieguito River Park Joint Powers Authority 2000).

Since the initial restoration effort was completed, the restoration goal has been expanded to address both the west and east sides of I-5 with the stated goal of restoring what remains of the historically significant San Dieguito Lagoon System. In 1992, the California Coastal Commission approved the San Dieguito Lagoon as the site for SCE to implement mitigation required for the San Onofre Nuclear Generating Station's new permit conditions. Mitigation

includes the creation or substantial restoration of 150 acres of tidal wetlands. Additional acreage will be restored to fulfill the conditions of a compromise settlement between SCE and Earth Island Institute, Inc. The San Dieguito Wetland Restoration Project EIR/EIS (September 2000) addresses both of these restoration efforts and identifies the Mixed Habitat Alternative as the preferred alternative. The proposal to restore coastal wetlands is the predominant element of a larger restoration and public access plan for all of the public open-space lands within the San Dieguito River Valley. The entire restoration planning area encompasses 440 acres. Beneficial impacts identified in the EIR/EIS include, but are not limited to, opening the tidal channel and maintaining tidal exchange between the ocean and wetland, and improvement of habitat for associated species.

### Los Peñasquitos Lagoon

The Los Peñasquitos Lagoon, approximately 640 acres in size, is located in the northwestern corner of the City of San Diego, directly south of the City of Del Mar (Figure 2-4). The California Department of Parks and Recreation is the primary owner of the lagoon with smaller parcels being held by the State Coastal Conservancy and the City of San Diego. Beaches to the north and south of the mouth are state recreation areas, Los Peñasquitos Canyon Preserve extends to the southeast, and Torrey Pines State Park lies atop the bluffs to the south. The lagoon is designated as Open Space in the City of San Diego general plan. Recently, the status of Los Peñasquitos Lagoon was raised from "State Park" to "State Reserve" and then to "State Preserve" which has the most restricted usage.

Habitats present in or within the vicinity of Los Peñasquitos Lagoon include, but are not limited to, open water (estuarine and fresh), sand/mudflats, coastal salt marsh, fresh/brackish marsh, riparian, and Diegan coastal sage scrub.

In 1985, the Los Peñasquitos Lagoon Foundation and the State Coastal Conservancy prepared the Los Peñasquitos Lagoon Enhancement Plan and Program to describe measures for restoring and enhancing the natural environmental qualities of the lagoon (Coppock et al. 1985). Many of the existing conditions identified in the 1985 plan, such as lagoon mouth closures, presence of Pacific Coast Highway 101 and the railroad berm which impede tidal flow, and exotic vegetation intrusion, still affect the environmental qualities of the lagoon. Dramatic changes in the watershed resulting from increased urbanization since 1985 have introduced new issues that will be addressed in a revised enhancement plan (Hastings pers. comm. 2003), including increased year-round freshwater input, accelerated sedimentation, reduced tidal mixing, and water contamination. In 2000, the Los Peñasquitos Lagoon Foundation prepared A Summary Analysis of Existing Conditions Affecting Los Peñasquitos Lagoon and Watershed to highlight existing conditions that affect the health of the lagoon and future enhancement efforts. Currently, it is expected that an ongoing hydrology study (Hastings pers. comm. 2003) will fill in data gaps and will help to reprioritize enhancement objectives for the 1985 enhancement plan which is in the process of revision. Although the issue of accelerated sedimentation in the lagoon has become a major enhancement focus, the issues of lagoon mouth closures and the need for more tidal circulation are still major objectives (Hastings pers. comm. 2003).

## **APPENDIX 3.14-A**

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**4(f) AND 6(f) PROPERTIES**



**Alignment Comparison Table**

**Publicly Owned Parks, Government Conservation Lands, and Wildlife/Waterfowl Refuges**

Rail Improvement Alignment Options	Section 4(f) Parks/ Recreational Resources within 900' of Centerline (H,M,L)	Section 6(f) Water Conservation Fund Properties within 900' of Centerline (H,M,L)	Potential for Direct Impacts	Potential for Constructive Use
<b>Union Station To Fullerton Station – 4<sup>th</sup> Main Track</b>	Ford Park – Low; Adlena Park – Low; Independence Park – Medium; Pacific Park – Medium; Neff Park – Medium; Zimmerman Park – High; El Toro Marine Corps Air Station – High; Marine Corps Air Station (helicopter) – High; Amerige Park – High	None	Zimmerman Park – High; El Toro Marine Corps Air Station – High; Marine Corps Air Station (helicopter) – High; Amerige Park – High	Ford Park – Low; Adlena Park – Low; Independence Park – Medium; Pacific Park – Medium; Neff Park – Medium
<b>Fullerton Station To Irvine Station--Double Tracking</b>				
AT-GRADE between Orange and Santa Ana	Hart Park – Low; El Camino Park – Low; Tustin Centennial Park – Low; Logan Park – Medium; Lemon Park – Medium; El Toro Marine Corps Air Station – High; Marine Corps Air Station (helicopter) – High; Hoeptner Park – High	El Camino Park Development – Low	El Toro Marine Corps Air Station – High; Marine Corps Air Station (helicopter) – High; Hoeptner Park – High	Tustin Centennial Park – Low; Logan Park – Medium; Hart Park – Low; El Camino Park – Low; Lemon Park – Medium

Rail Improvement Alignment Options	Section 4(f) Parks/ Recreational Resources within 900' of Centerline (H,M,L)	Section 6(f) Water Conservation Fund Properties within 900' of Centerline (H,M,L)	Potential for Direct Impacts	Potential for Constructive Use
TRENCH between Orange and Santa Ana	Tustin Centennial Park – Low; Logan Park – Medium; Hart Park – Low; El Camino Park – Low; Lemon Park – Medium; El Toro Marine Corps Air Station – High; Marine Corps Air Station (helicopter) – High; Hoeptner Park – High	El Camino Park Development	El Toro Marine Corps Air Station – High; Marine Corps Air Station (helicopter) – High; Hoeptner Park – High	Tustin Centennial Park – Low; Hart Park – Low; El Camino Park – Low; Lemon Park – Medium; Logan Park – Medium
<b>Stations</b>				
Fullerton	Lemon Park – Medium	None	None	Lemon Park – Medium
Anaheim	None	None	None	None
Santa Ana	Logan Park – Medium	None	None	Logan Park – Medium
Irvine	El Toro Marine Corps Air Station – High	None	El Toro Marine Corps Air Station – High	None
<b>San Juan Capistrano Double Tracking</b>				
TUNNEL along I-5 between Hwy 73 and Avenida Aeropuerto	Cook Park – Low; Serra Park – High		Serra Park – High	Cook Park – Low
AT-GRADE and Cut/Cover TRENCH along east side of Trabuco Creek	Rio Oso Park - High	None	Rio Oso Park - High	None
<b>Stations</b>				
San Juan Capistrano	None	None	None	None

Rail Improvement Alignment Options	Section 4(f) Parks/ Recreational Resources within 900' of Centerline (H,M,L)	Section 6(f) Water Conservation Fund Properties within 900' of Centerline (H,M,L)	Potential for Direct Impacts	Potential for Constructive Use
<b>Dana Point/San Clemente Double Tracking</b>				
Dana Point Curve Realignment; San Clemente - SHORT TUNNEL	Mission Bell Park – Low; Del Obispo Park – Low; Bonito Canyon Park – Medium; Pine Park – Medium; San Luis Rey Park – Medium; San Onofre State Beach – High; Camp Pendleton Marine Corps Base – High; San Clemente State Beach – High; Doheny State Beach – High; Leyton Park – High; Palisades Gazebo Park – High	Doheny Beach Acquisition – High; San Clemente State Beach – High	San Onofre State Beach – High; Camp Pendleton Marine Corps Base – High; San Clemente State Beach – High; Doheny State Beach – High; Leyton Park – High; Palisades Gazebo Park – High	Mission Bell Park – Low; Del Obispo Park – Low; Bonito Canyon Park – Medium; Pine Park – Medium; San Luis Rey Park – Medium
San Clemente - LONG TWO-SEGMENT TUNNEL	Verde Park – Low; Mission Bell Park – Low; San Luis Rey Park – Medium; Sunset Park – Medium; Bonito Canyon Park – Medium; San Onofre State Beach – High; Camp Pendleton Marine Corps Base – High; San Clemente State Beach – High; Doheny State Beach – High; San Gorgonio Park – High	Doheny Beach Acquisition – High; San Clemente State Beach – High	San Onofre State Beach – High; Camp Pendleton Marine Corps Base – High; San Clemente State Beach – High; Doheny State Beach – High; San Gorgonio Park – High	Verde Park – Low; Mission Bell Park – Low; San Luis Rey Park – Medium; Sunset Park – Medium; Bonito Canyon Park – Medium

<b>Rail Improvement Alignment Options</b>	<b>Section 4(f) Parks/ Recreational Resources within 900' of Centerline (H,M,L)</b>	<b>Section 6(f) Water Conservation Fund Properties within 900' of Centerline (H,M,L)</b>	<b>Potential for Direct Impacts</b>	<b>Potential for Constructive Use</b>
Stations				
San Clemente	None	None	None	None
<b>Camp Pendleton At-grade Double Tracking</b>	Camp Pendleton Marine Corps Base – High; San Onofre State Beach – High	None	Camp Pendleton Marine Corps Base – High; San Onofre State Beach – High	None
<b>Oceanside/Carlsbad Double Tracking</b>				
Carlsbad - AT-GRADE; double tracking	Leucadia State Beach – Low; Pacific Street Linear Park – Low; Rotary Park – Low; Carlsbad State Beach – Medium; South Carlsbad State Beach – High; Batiquitos Lagoon Ecological Reserve – High; Camp Pendleton Marine Corps Base – High;	None	South Carlsbad State Beach – High; Batiquitos Lagoon Ecological Reserve – High; Camp Pendleton Marine Corps Base – High;	Leucadia State Beach – Low; Pacific Street Linear Park – Low; Rotary Park – Low; Carlsbad State Beach – Medium
Carlsbad -TRENCH; double-tracking	Leucadia State Beach – Low; Pacific Street Linear Park – Low; Rotary Park – Low; Carlsbad State Beach – Medium; South Carlsbad State Beach – High; Batiquitos Lagoon Ecological Reserve – High; Camp Pendleton Marine Corps Base – High	None	South Carlsbad State Beach – High; Batiquitos Lagoon Ecological Reserve – High; Camp Pendleton Marine Corps Base – High	Leucadia State Beach – Low; Pacific Street Linear Park – Low; Rotary Park – Low; Carlsbad State Beach – Medium

Rail Improvement Alignment Options	Section 4(f) Parks/ Recreational Resources within 900' of Centerline (H,M,L)	Section 6(f) Water Conservation Fund Properties within 900' of Centerline (H,M,L)	Potential for Direct Impacts	Potential for Constructive Use
Stations				
Oceanside	Tyson Street Park – Medium; Pacific Street Linear Park – Medium; Rotary Park – Medium	None	None	Tyson Street Park – Medium; Pacific Street Linear Park – Medium; Rotary Park – Medium
<b>Encinitas/Solana Beach Double Tracking</b>				
Encinitas - AT-GRADE	Leucadia State Beach – Low; South Carlsbad State Beach – Low; Orpheus Park – Low; View Point Park – Medium; Moonlight State Beach – Medium; Cardiff State Beach – Medium; San Elijo Lagoon Ecological Reserve – High; San Elijo State Beach – High;	San Elijo Lagoon County Park and Ecological Preserve – High	San Elijo Lagoon Ecological Reserve – High; San Elijo State Beach – High	Leucadia State Beach – Low; South Carlsbad State Beach – Low; Orpheus Park – Low; View Point Park – Medium; Moonlight State Beach – Medium; Cardiff State Beach – Medium
Encinitas – SHORT TRENCH	Leucadia State Beach – Low; South Carlsbad State Beach – Low; Orpheus Park – Low; View Point Park – Medium; Moonlight State Beach – Medium; Cardiff State Beach – Medium; San Elijo Lagoon Ecological Reserve – High; San Elijo State Beach – High	San Elijo Lagoon County Park and Ecological Preserve – High	San Elijo Lagoon Ecological Reserve – High; San Elijo State Beach – High	Leucadia State Beach – Low; South Carlsbad State Beach – Low; Orpheus Park – Low; View Point Park – Medium; Moonlight State Beach – Medium; Cardiff State Beach – Medium

Rail Improvement Alignment Options	Section 4(f) Parks/ Recreational Resources within 900' of Centerline (H,M,L)	Section 6(f) Water Conservation Fund Properties within 900' of Centerline (H,M,L)	Potential for Direct Impacts	Potential for Constructive Use
Stations				
Solana Beach	None	None	None	None
<b>Del Mar Double Tracking</b>				
TUNNEL under Camino Del Mar	Torrey Pines State Beach – High; Torrey Pines State Reserve – High; Powerhouse Park – High; San Dieguito Ecological Preserve - Med	San Dieguito Ecological Preserve - Med	Torrey Pines State Beach – High; Torrey Pines State Reserve – High; Powerhouse Park – High	San Dieguito Ecological Preserve - Med
TUNNEL along I-5	Torrey Pines State Reserve - High; San Dieguito Lagoon Ecological Reserve - High	San Dieguito Lagoon Ecological Reserve - High	Torrey Pines State Reserve - High; San Dieguito Lagoon Ecological Reserve - High	None
<b>I-5/805 Split To Hwy 52 Double Tracking</b>				
Miramar Hill TUNNEL	Villa La Jolla Park – Low; Marian Bear Memorial Natural Park – Medium; Naval Reservation – High; UC San Diego – High;	None	Naval Reservation – High; UC San Diego – High;	Villa La Jolla Park – Low; Marian Bear Memorial Natural Park – Medium
I-5 TUNNEL	Marian Bear Memorial Natural Park – Medium; Naval Reservation – High; UC San Diego – High; Mandell Weiss Eastgate Park – High	None	Naval Reservation – High; UC San Diego – High; Mandell Weiss Eastgate Park – High	Marian Bear Memorial Natural Park – Medium

Rail Improvement Alignment Options	Section 4(f) Parks/ Recreational Resources within 900' of Centerline (H,M,L)	Section 6(f) Water Conservation Fund Properties within 900' of Centerline (H,M,L)	Potential for Direct Impacts	Potential for Constructive Use
Stations				
UTC (Only applies to Miramar Hill Tunnel)	UC San Diego – Low; Mandell Weiss Eastgate Park – High	None	Mandell Weiss Eastgate Park – High	UC San Diego – Low
<b>Hwy 52 To Santa Fe Depot Curve realignment and Double Tracking</b>	Naval Reservation – Low; Presidio Park – Low; Old Town San Diego Historic Park – High; Mission Bay Park – High; Marian Bear Memorial Natural Park – High	None	Old Town San Diego Historic Park – High; Mission Bay Park – High; Marian Bear Memorial Natural Park – High	Naval Reservation – Low; Presidio Park – Low
Stations				
Santa Fe Depot	Pantoja Park – Low; Naval Reservation – Medium	None	None	Pantoja Park – Low; Naval Reservation – Medium

